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ABSTRACT

A more complete understanding of global perspective is provided in this essay through an examination of the modes of thought, sensitivities, intellectual skills, and explanatory capacities which contribute to the formation of a global perspective. With an emphasis on both a formal and informal educational level, the essay is divided into five sections which examine the requirements for an attainable global perspective. Section 1, Perspective Consciousness, underscores the need to recognize the concept that everyone's perspective is shaped by subtle influences and that others may have different perspectives. Section 2, State of the Planet Awareness, examines the problems and solutions for increasing the ability of individuals to intelligently interpret information about world conditions. Section 3, Cross Cultural Awareness, describes the different degrees of cross-cultural awareness and the necessity to reach a stage beyond empathy where one has the capacity to imagine oneself in a role within the context of a foreign culture. Section 4, Knowledge of Global Dynamics, analyzes the world as an interdependent system where the issue of growth may be the predominant contemporary problem. Section 5, Awareness of Human Choices, emphasizes that increased global perspective will require difficult value decisions about the solutions to our world problems. (Author/DE)

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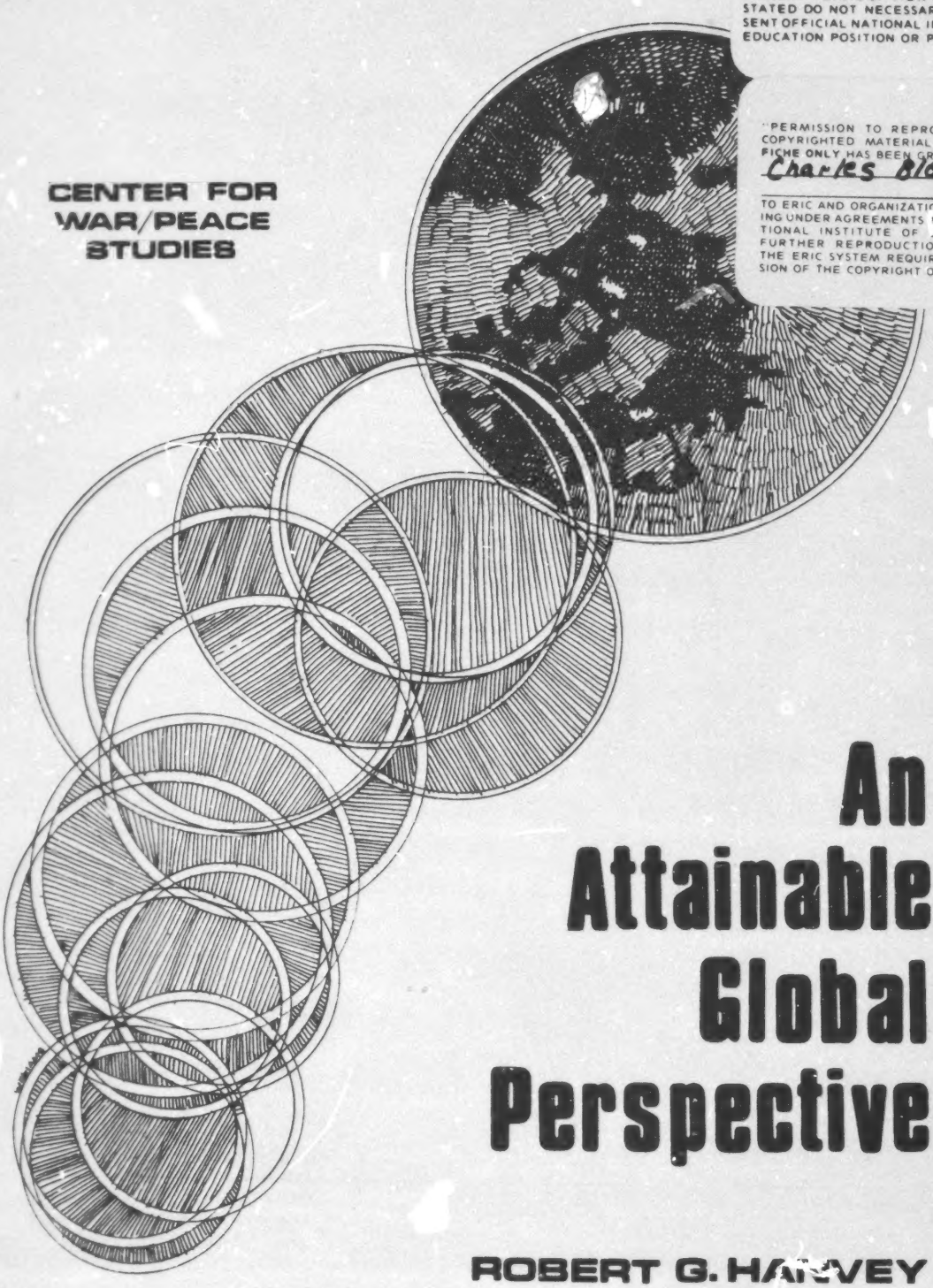

An Attainable Global Perspective

ROBERT G. HARVEY

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This essay is a beginning effort to define some elements of what we call a global perspective – to flesh out some of the things we will need to know and understand if we are to cope with the challenges of an increasingly interdependent world. The views are those of the author, published here to begin the discussion, debate, and analysis which will be necessary for a widespread and more complete understanding of what global perspectives are and how they can become part of the school curriculum.

Another exploration of questions raised for education by interdependence is the publication *A New Civic Literacy: American Education and Global Interdependence* by Ward Morehouse, Interdependence Series # 3, published by the Aspen Institute for Humanistic Studies, Rosedale Road, P.O. Box 2820, Princeton, NJ 08540. This is available at $1.00 per copy.

Robert G. Hanvey

An Attainable Global Perspective

Introduction

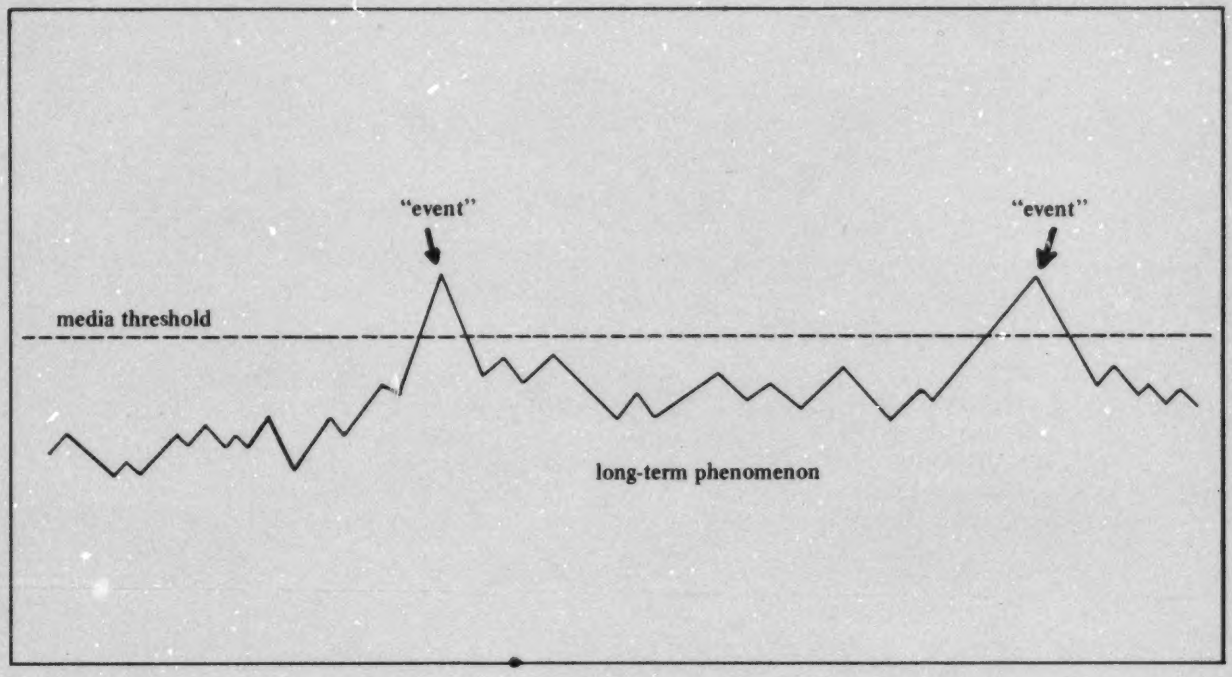
This is an attempt to describe certain modes of thought, sensitivities, intellectual skills, and explanatory capacities which might *in some measure* contribute to the formation of a global perspective and *which young people in the U.S. might actually be able to acquire in the course of their formal and informal education.* That is what is meant here by an *attainable* global perspective. By speaking in such terms, we imply a modesty of goals. This indeed is our orientation, to provide some contrast with the general practice of stating objectives in ideal and often extreme terms.

What is a global perspective? Operationally, we will say that it consists *partly* of the modes of thought, skills, etc. that will be discussed in the following pages. But as conceived here a global perspective is not a quantum, something you either have or don't have. It is a blend of many things and any given individual may be rich in certain elements and relatively lacking in others. The educational goal broadly seen may be to socialize significant *collectivities* of people so that the important elements of a global perspective are represented in the group. Viewed in this way a global perspective may be a variable trait possessed in some form and degree by a population, with the precise character of that perspective determined by the specialized capacities, predispositions, and attitudes of the group's members. The implication of this notion, of course, is that diversified talents and inclinations can be encouraged and that standardized educational effects are not required. Every individual does not have to be brought to the same level of intellectual and moral development in order for a population to be moving in the direction of a more global perspective.

In keeping with modesty of aspirations it is especially important at the outset to admit the limited impact of formal schooling and the often profound impact of informal socialization. Schools are hard put to match the drama and appeal of the mass media or the grip on behavior and attitude exerted by the peer group. Furthermore, whatever is learned while young is continuously reshaped by later experience. The world view of an American farmer will no doubt reflect his schooling to some extent, but it is likely to be most importantly influenced by exigencies associated with his role as a farmer and by attitudes currently held by his most important reference group – other farmers.

If adult role and informal agencies of socialization are very important, can the schools contribute meaningfully? Yes, especially if they are able to stake out areas of special competence. The schools must select a niche that complements the other educative agencies of the society. To the extent that those other agencies and influences work against a global perspective the schools can perform a corrective function; to the extent that the other agencies are glib and superficial the schools can seek to be more thorough; to the extent that the other agencies have blind spots the schools can work to supply the missing detail; to the extent that the other agencies direct the attention to the short-term extraordinary event the schools can assert the value of examining the long-term situation or trend (which is sometimes extraordinary in its own right).

Consider, for example, public information and socialization in the U.S. with respect to nuclear weapons policies. For many years the governments of the U.S. and the USSR have influenced each other in multiple ways by developing, maintaining, and threatening to use nuclear weapons of awesome destructiveness. The populations of each country, *and the population of the world,* have been held hostage to this terrible threat. But neither government really informs its population about the true dimensions of the threat. Films of H-bomb tests, for example, have not been shown to the American or Russian people. Generations of school children grow up without examining this profound influence on national and international policies, without really under-



standing what a single warhead would do to a city and its environs. Occasionally, when there is some change or special event such as a weapons test or a political agreement the long-standing theories of deterrence will be reviewed in the media. But there is little probing of the assumptions that underlie the policies, or reexamination of the potentialities of destruction. The media are event-centered. A volcano is of interest to them only when it erupts.

The result of this pattern is that the general perception of important phenomena is limited and distorted; the public sees only those manifestations that are novel enough to rise above the media's threshold of excitability. But the phenomena, whether they be policies of deterrence, or corporate investments in the developing countries, or government investments in scientific research, or the protein consumption habits of industrialized populations, continue to affect our lives, visible or not.

In fairness to the media it must be admitted that such phenomena are not, by and large, intrinsically interesting to most people. To specialized groups, yes, but not to broad publics. And interest is what keeps newspapers and television stations alive. It must also be admitted that *some* newspapers provide extremely important resources for broad public education and that the television networks occasionally reach millions with significant documentaries and background stories. But the general characterization of the media as event-centered is not, I think, unreasonable.

The media, of course, are more than event-centered. They are culture-bound and culture-generating. That is, they reflect the culture and reinforce it but are also capable of turning it in new directions. The culture says, "Consume!" and the media transmit that message – ingeniously, seductively, repetitively, persuasively. Very persuasively. And the audience responds to the cultural command. It does not question what it is told to consume. Electric heating is clean – be the proud owner of an all-electric house. Be sure that the new car can reach 60 miles per hour in ten seconds, even with the air conditioner on. Buy the lawn fertilizer with the weed killer built in. Then the times change – and the messages change. Consume, yes, but also conserve. And watch for environmental effects. And the media, always there on the growing edge of cultural transformation, pass the new messages along with the same devotion to technical quality and the same servility to whatever it is currently correct to believe in that particular society. The messages may be socially useful – or not. But the influence is there, the long reach into every home and hotel room and bar, the powerful reinforcing of enduring cultural ideas, themes, stereotypes, coupled with the equally powerful capacity to mobilize altogether new patterns of belief and opinion almost overnight.

If this is the way the media are: event-centered, and potent servants of both traditional and emergent elements of the national culture, what then for the schools? The schools, after all, are also carriers of the national culture. But the schools must stake out a niche that balances and corrects the media. The schools may be bearers of culture but they are also agents of an academic tradition that encourages scrutiny of that which seems conventional and obvious. If the media direct attention to events, the schools must look beneath the apparent event at the phenomena really involved. If the media say, "Believe this way!" the schools must reveal that in other times and other places people believed and now believe in quite different ways. At the very least every young person should have experiences in school which demonstrate in a lasting fashion that (1) there are substrata to the visible event and (2) culture affects the perception of human affairs. Thus educated, the person's reactions to reports in the media should be, minimally, "There may be more there than meets the eye," and "Other eyes might see it differently." Those are truisms but the schools can put flesh on them.

Perspective Consciousness

the recognition or awareness on the part of the individual that he or she has a view of the world that is not universally shared, that this view of the world has been and continues to be shaped by influences that often escape conscious detection, and that others have views of the world that are profoundly different from one's own

Few of us in our lives can actually transcend the viewpoint presented by the common carriers of information and almost none of us can transcend the cognitive mapping presented by the culture we grew up in. But with effort we can at least develop a dim sense *that we have a perspective, that it can be shaped by subtle influences, that others have different perspectives.* This recognition of the existence, the malleability, and the diversity of perspective we might call perspective consciousness. Such an acknowledgement is an important step in the development of a perspective that can legitimately be called global.

Achieving perspective consciousness is no small accomplishment. It is probably true that most people in most societies do not sense the uniqueness of their own or their society's world view. Herman Kahn in *The Emerging Japanese Superstate* tells the following anecdote:

> The Japanese do not think of themselves as being racist. I once brought sharp surprise to a number of senior Americans and Japanese with whom I was having dinner by suggesting that in some ways Japan is the most racist nation in the world. One of them asked me to explain what I meant. I started, of course, with the obvious point that the Japanese, at least in comparison with other groups, are relatively pure racially. There are, so to speak, no blond Japanese, no red-haired Japanese, no blue-eyed Japanese. And the attitude of the Japanese toward miscegenation is very different from that of, say, the French or the Chinese. If somebody is born of a mixed marriage in France or China but grows up perfectly familiar with and skilled in the indigenous culture, he is largely accepted. That is not true in Japan. The children of mixed marriages are more or less permanently barred from participating fully and comfortably in the society. Those bars also hold against children born in Japan but of Korean or Chinese parentage. *One crucial point in the discussion was that the Japanese do not normally notice that they discriminate against these minorities, because the discrimination is so thorough that the issue usually does not arise* [my italics]. I asked the Japanese if they could imagine, for example, having a General of Korean parentage. They could not. I pointed out that it was perfectly possible in China.*

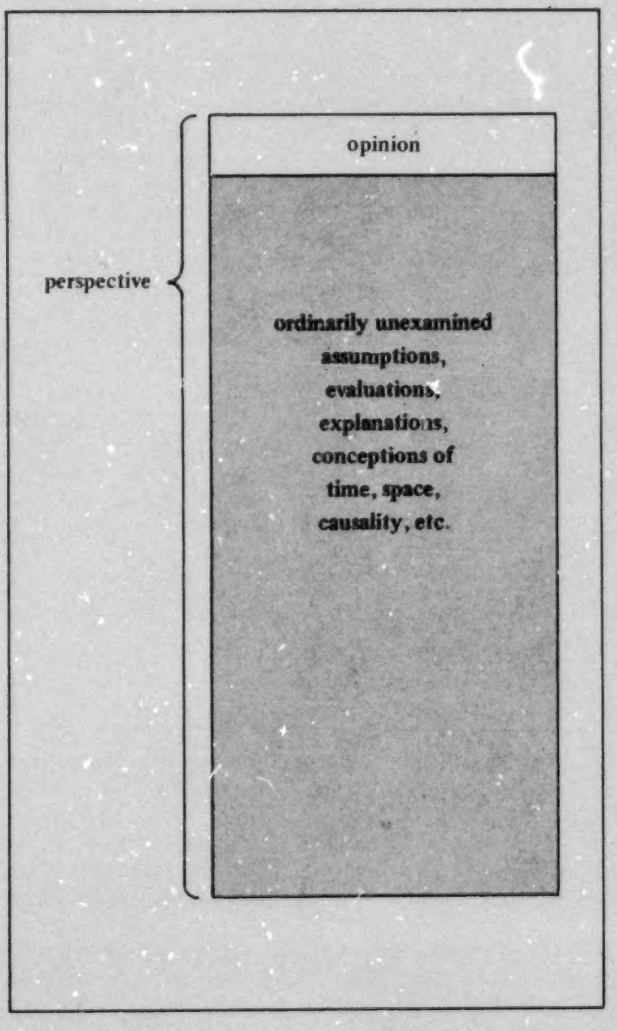
It could be argued that people are very aware of differences in perspective, or at least of opinion. The Japanese may be blind to their racism, but Americans are surely aware of the racist elements in their own society and keenly aware that different factions within the society have different views of appropriate behavior with respect to minorities. And if the media are important shapers of perspective, isn't it true that conflict and dispute are the main diet of the press and electronic media? Anyone exposed to these influences must certainly know very early in life that people differ radically in their perspectives.

Opinion and Perspective

Here, I think, one must make a distinction between opinion and perspective. Opinion is the surface layer, the conscious outcropping of perspective. But there are deep and hidden layers of perspective that may be more important in orienting behavior. In such deep layers lies the Japanese view of other ethnic groups. Korean inferiority, note, is not a matter of opinion to the Japanese. It is profoundly assumed and thus not recognized as racism by the Japanese. Similarly, in the deep layers of Western civilization has been the assumption that human dominance over nature is both attainable and desirable. This, too, until recently, has not been a matter of opinion.

One of the interesting things that reform and protest movements do is to carry out mining operations in the deep layers. They dredge to the surface aspects of perspective that

* Herman Kahn, *The Emerging Japanese Superstate* (Prentice-Hall, 1970), pp. 72, 73.



have never before seen the light of day. Once made visible, these may become the foci of debate, matters of opinion. The environmental movement surfaced the assumption of man's right to dominion over nature and thus posed some philosophical choices that had previously escaped notice. The feminist movement raised the consciousness of women and men with respect to "woman's place." They labeled the most commonplace behaviors and attitudes "chauvinist," and thus revealed the deeper layers of perspective in action.

I have suggested that with effort we can develop in the young at least a dim sense, a groping recognition of the fact that they have a perspective. And this is very different from knowing that they have opinions. At the present time the schools and the media socialize all of us to be traders in opinion. We learn this through discussion and debate, through the contentious format of forums and organizational meetings, through talk shows and newspaper columnists. We learn, especially, that the individual is expected to have opinions and to be willing to assert them. And we learn tacit rules about "tolerating" differences in opinions so asserted.

We can also learn, if we approach the task with a sure sense of purpose, how to probe the deep layers of perspective. A variety of specialists and social commentators regularly operate in these realms and there are well-developed methods and techniques. Some of these methods can be learned and practiced. For example, some (but not all) values clarification exercises can heighten awareness of otherwise unrevealed aspects of perspective. At the very least it should be possible to teach almost any young person to recognize a probe of the deep layers when he sees it. Such probes come in many forms, from the ironic humor of a "Doonesbury" cartoon strip to the pop sociology of a book like *Future Shock*.

There are practical steps that schools can take to develop perspective consciousness in students and to develop other dimensions that will contribute to the enhancement of a global perspective. We turn, now, to those other dimensions.

"State of the Planet" Awareness

awareness of prevailing world conditions and developments, including emergent conditions and trends, e.g. population growth, migrations, economic conditions, resources and physical environment, political developments, science and technology, law, health, inter-nation and intra-nation conflicts, etc.

For most people in the world direct experience beyond the local community is infrequent – or nonexistent. It is not uncommon to meet residents of Chicago neighborhoods who have never traveled the few miles to the central business district, or sophisticated New York taxicab drivers who have never been further south than Philadelphia. If this is true for a geographically mobile society like the U.S. it is even more a fact for other parts of the world. Tourism, urban migrations, commerce, and business travel notwithstanding, most people live out their lives in rather circumscribed local surroundings.

Communication Media and Planet Awareness

But direct experience is not the way that contemporary peoples learn about their world. Margaret Mead writes:

> Only yesterday, a New Guinea native's only contact with modern civilization may have been a trade knife that was passed from hand to hand into his village or an airplane seen in the sky; today, as soon as he enters the smallest frontier settlement, he meets the transistor radio. Until yesterday, the village dwellers everywhere were cut off from the urban life of their own country; today radio and television bring them sounds and sights of cities all over the world.*

Nonliterate villager or suburban housewife, it doesn't matter that one stays close to home. Information travels, rapidly and far. News of a border crisis in the Middle East reaches within hours the shopkeeper in Nairobi, the steel worker in Sweden, the Peruvian villager. There is now a demonstrated technical capacity for simultaneous transmission of messages to almost the entire human species. The character of the messages is something else again. Here we must ask, Do the messages received on those millions of transistor radios and television sets contribute meaningfully to a valid picture of world conditions? That question matters because it is difficult to imagine a global perspective that does not include a reasonably dependable sense of what shape the world is in.

Generally speaking, the media in almost every country will transmit news from around the world. As we discussed earlier, the fundamental quality of news is its focus on the extraordinary event. An outbreak of influenza is news; endemic malaria is not. A rapid decline in values on the world's stock exchanges is news; the long-standing poverty of hundreds of millions is not. So, there are significant limits and distortions in the view of the world conveyed by news media. Nonetheless, the prospect is not entirely bleak. For one thing, the characteristic interests of the news media can be exploited; events can be staged in such a way as to call attention to world conditions not ordinarily judged newsworthy. A world conference can be convened on food or population or pollution problems. The conference itself is news. More importantly, the condition that gives rise to the conference takes on a new level of visibility—worldwide. And the news media are the instruments of this increased awareness.

Communication media, of course, transmit more than news. The local community's images of the world outside are drawn to a substantial degree from the make-believe world of cinema and television drama. The distortions associated with dramatic presentations are well documented. The lifeways and cultural types of other countries are frequently caricatured; ironically, the lifeways and types of one's own society are also commonly caricatured. While the export of films and television series from a country may mean an improved balance of payments, it by no means assures an improved balance of perspective. The world consumers of American television and film can be excused for believing that the U.S. population consists largely of ranchers, doctors, policemen, and gangsters.

* Margaret Mead, *Culture and Commitment* (Natural History Press/Doubleday, 1970), p. 71.

Limits to Understanding

There are other sources of distortion. Political ideology chokes off the flow of some information, the defense and security syndrome of nations blocks still other information, and the selective disinterest of audiences constricts yet other channels. As an instance of the first, Americans until recently have had little access to information about Cuba under Castro. As an example of the second, the testing of nuclear weapons by the French and the Indians in recent years produced few hard details about site, yield, fallout, etc. (Governments have ways to obtain the information; publics do not.) As for patterns of audience interest and disinterest, consider how little attention is paid to the affairs of small nations, or to conditions in the rural areas of the world. And with no complaint from the audience.

Finally, there is the matter of the technical nature of world data. There are now unprecedented resources for generating information about the state of the planet, and for sharing and processing the information in order to obtain a sense of the important patterns. But the procedures are highly technical and the results expressed in technical terms. A certain level of education is required to see the full significance of the data. The case of ozone in the stratosphere is instructive.

While environmental scientists are concerned about too-high ozone levels in the air of cities (since it produces emphysema-like effects) there is also concern about the possible depletion of ozone in the stratosphere. Ozone in the stratosphere blocks out much of the sun's ultraviolet radiation. Such radiation is so harmful that scientists believe that surface life did not evolve on the earth until after the ozone layer had been formed. There is now a real possibility that gases released into the air by man will reduce this ozone by significant amounts. One villain is the propellant gas used in aerosol cans. This gas is very inert in the atmosphere (which is why it can be mixed with the many compounds found in spray cans), but recent research has shown that it breaks down under certain wavelengths of ultraviolet light. When it breaks down, chlorine is released, which acts as a catalyst and destroys ozone. Thus, the gas escapes into the atmosphere when the spray can is used; it does not degrade in the atmosphere (since it does not react with other gases); some of it seeps into the stratosphere, is broken down by ultraviolet light, and the released chlorine destroys ozone. Predicted results: increased number of skin cancer cases, possible biological damage to vegetation and some insect species, possible effects on plankton in the oceans, possible effects on climate.

This is a world condition. Even if we stop using aerosol cans now, propellant gas which might destroy an estimated 5 percent of the planet's ozone layer has already been released. If the propellant gases continue to be produced and production increases at its present annual rate, then ozone depletion might reach 30 percent by 1994.*

These projections are not certainties. Furthermore, the ozone, even if depleted, will eventually build to original levels if the destructive agents are controlled. So the situation is not necessarily dire. But there is a basis for concern. The question is, Who will understand and share that concern? Can a problem like stratospheric ozone depletion be widely comprehended so that it becomes a living part of what a general populace knows about the planet? Or are such problems fated to stay within the private realms of specialists?

Overcoming the Limitations

This is an instance where the energies of the schools, properly directed, might resolve the question in favor of the general populace. If from the earliest grades on students examined and puzzled over cases where seemingly innocent behaviors – the diet rich in animal protein, the lavish use of fertilizer on the suburban lawn and golf course – were shown to have effects that were both unintended and global in scope, then there could be a receptivity for the kind of information involved in the ozone case. The ozone situation would not seem forbidding; it would be another instance of a model already documented. Students would have a framework within which to handle it. As for the technical aspects of the ozone situation, these do not seem beyond the reach of science and social studies departments *that focus cooperatively on the technical dimensions of significant planetary conditions.* It may be true that school programs are not typically organized for such a task, but it is not outside the boundaries of our predilections or our capacities.

Suppose the schools do not work at the task of increasing the ability of individuals to consume information intelligently about world conditions, or even at the simpler task of transmitting raw information about such conditions. Suppose, for example, that the schools choose to ignore environmental conditions, problems of world resources, trends in population, the economic circumstances of various world regions, political developments, social movements, changes in technology, developments in world law, etc. Can a "state of the planet" awareness be achieved without the participation of formal educational institutions? I suspect so. Despite the flaws and distortions of the media there is simply no question that people everywhere are being reached with a flow of information about planetary conditions – a flow that would have seemed impossible even a generation ago. The quantity of information will probably continue to increase. And so will the quality. General public awareness of the state of the planet may be one of the more attainable elements in a global perspective.

Furthermore, we are not entirely dependent on broad public awareness, whether it comes from the media or the schools. Since a global perspective is here defined as a collective achievement, the role of specialists should be given its due. Every society depends on its specialists to sense aspects of the environment not generally perceived by the masses. If the specialists are aware of important conditions in the world, then in effect the whole society has the benefit of that awareness (or at least potentially has the benefit of it). Perhaps few people can grasp the meaning and danger of exponential growth in population and resource consumption. But if those few can share their alarm with policymakers the direction and value orientation of whole nations can be altered.

* "Stratospheric Pollution: Multiple Threats to Earth's Ozone," *Science*, October 25, 1974, pp. 335-338.

Cross-cultural Awareness

awareness of the diversity of ideas and practices to be found in human societies around the world, of how such ideas and practices compare, and including some limited recognition of how the ideas and ways of one's own society might be viewed from other vantage points

This may be one of the more difficult dimensions to attain. It is one thing to have some knowledge of world conditions. The air is saturated with that kind of information. It is another thing to comprehend and accept the consequences of the basic human capacity for creating unique cultures – with the resultant profound differences in outlook and practice manifested among societies. These differences are widely known at the level of myth, prejudice, and tourist impression. But they are not deeply and truly known – in spite of the well-worn exhortation to "understand others." Such a fundamental acceptance seems to be resisted by powerful forces in the human psychosocial system. Attainment of cross-cultural awareness and empathy at a significant level will require methods that circumvent or otherwise counter those resisting forces. Let us think afresh about what such methods might be, with a full recognition of how difficult the task will be and a corresponding willingness to discard ideas that don't work.

Does Understanding Follow Contact

One of the cherished ideas of our own times and of earlier times is that contact between societies leads to understanding. The durability of this notion is awesome considering the thousands of years of documented evidence to the contrary. Consider the following example. When the French began to explore North America they came into contact with a number of aboriginal groups. At various times they attempted to muster the males of these groups into fighting units. The Indians clearly had no aversion to fighting; they were warriors, skilled in the use of arms, proud of triumphs over an enemy. But they would not take orders. French commanders had no control and the so-called chiefs of these groups depended on persuasion, which might or might not be successful. Every individual Indian warrior made his own decisions about whether to join a raid or war party, worked out his own battle strategy, and left the fray when he chose.

This kind of contact between the French and the Indians provided the French with detailed information on the ways of their Indian allies – information they noted scornfully in their journals, sometimes sputtering in rage and frustration. But the behavior they described was incomprehensible to them. By virtue of the concrete experiences that the French had with the Indians, the French had rich data – but no understanding. The French were able to see Indian behavior only in the light of their own hierarchical social system, where it is natural for the few to command and the many to obey. Social systems that worked on other principles were literally unimaginable.

Of course, now we are more sophisticated. What happens when the nature of the contact between groups is not one of exploitation or domination but rather one of sympathetic assistance, and where there is at least some preparation for the cultural differences that will be encountered? Here is an account of Peace Corps experience in the Philippines:

> Most human relationships in the world are governed by a pervasive fatalism, in the Philippines best described by the Tagalog phrase, *bahala na*, which means, "never mind" or, "it will be all right" or, "it makes no difference." Americans, more than any other people in history, believe man can control his environment, can shape the forces of nature to change his destiny. That peculiarity, which is essentially Western, is quintessentially American.
>
> Most of the peoples of the world also value dependency and harmony relationships within the in-group. Rather than stress independence in relationships – freedom from restraint and freedom to make choices – they emphasize reciprocity of obligation and good will within the basic group and protection of that group against outsiders. It is the group – family, tribe or clan – which matters and not the individual. In the Philippines, this phenomemon is perhaps best described by the term *utang na loob* which means a reciprocal sense of gratitude and obligation.
>
> The value of independence in relationships and getting a job done makes us seem self-reliant, frank, empirical, hardworking, and efficient to ourselves. To Filipinos, the same behavior sometimes makes us seem to be unaware of our obligations, insensitive to feelings, unwilling to accept established practices, and downright aggressive. . . .
>
> Nearly all volunteers had to struggle to understand and deal with Filipino behavior that, when seen from our peculiar stress on independence in relationships as

opposed to Filipino *utang na loob*, was deeply distressing. . . . Filipinos wanted to be dependent on others and have others dependent on them; they were often ashamed in the presence of strangers and authority figures; they were afraid of being alone or leaving their families and communities; they showed extreme deference to superiors and expected the same from subordinates; they veiled true feelings and opinions in order not to hurt others or be hurt by them. . . .

It is one thing to study and understand *utang na loob*. It is another to have a principal treat you as a status figure and to insist that you tell him how to run his school, or to have children in your class cower in what seems to be shame, or to have neighbors who care much more that you should like them and that you should have a pleasurable experience than that you should get your job done.

Filipinos, with their incessant hospitality and curiosity, repeatedly made it plain that for them the main job of Peace Corps volunteers was to enjoy themselves and to enhance pleasure for those around them, an approach to life best described by the Filipino phrase, *pakikisama*. . . . Nothing was more difficult for volunteers to understand or accept than that Filipinos wanted them for pleasure in relationships and not to achieve the tasks to which they had been assigned. . . .

It was not just the Filipino's stress on *utang na loob* and *pakikisama* which interfered with getting the job done. It was also *bahala na*, the widespread fatalism of the barrio which showed itself in the lack of emotion at the death of little children, the persistent and nearly universal beliefs that ghosts and spirits control life and death, and the failure of Filipinos to keep promises and appointments. Why should the job matter when fate governs human existence? . . .

During the first two years, four volunteers resigned and twenty-six others were sent home, usually by mutual agreement, because they were not able or willing to cope with the extraordinary psychological burdens of being Peace Corps volunteers. Some volunteers developed a "what's the use" attitude and failed to appear at school, or made short unauthorized trips away from their barrios. Withdrawal was sometimes followed in the same volunteer by extremely hostile behavior against the Philippine Bureau of Public Schools, Washington, and the Peace Corps staff. Some volunteers, particularly those in the first group, wished there was some honorable way for them to cut short their tour of duty without an overwhelming sense of personal failure.*

The American Peace Corps volunteers, like the French officers of the 17th century, could not escape the powerful influence of their own culture, especially since that culture was so deeply embedded in the very definition of the mission. The task was to render assistance. And success was measured by some kind of closure, "getting the job done." Filipino behavior stood in the way of getting the job done. There were distractions, delays, and detours. And the positive reinforcements that a busy, efficient American would have received in his home setting were nowhere to be found. The result: puzzlement and frustration equivalent to that of the French in their relations with Indian groups.

Achieving Understanding

But some volunteers did solve the cultural puzzle.

> A male volunteer from South Carolina, D was as much admired by Filipinos and volunteers as any volunteer in the project. Almost from the first, he accepted people for what they were, learned the dialect, made friends, and seemed to enjoy that more than anything else. After two years, he wrote, "I consistently belived and followed a life based on getting away from all identity or entanglement with the Peace Corps. My reasons were . . . to figure out a little bit about what was going on in the Philippines, to see what was really significant in my own place, to try to understand life here, and to learn to function in a way that could be meaningful to me and the community. I burrowed into life here unmindful of anything but my community and involvement and survival. . . ."
>
> Although everyone had thought that he epitomized the ability of a volunteer to live deeply in the culture after just six months, he wrote toward the end of his third year, "I have continued to change here and have now sort of reached a point of being able to feel with others. This is different from understanding how they feel. I am able to be a part of them as they do things with each other and me. . . ."*

D was a success in both Filipino and Peace Corps terms. So was another volunteer

> A male volunteer from Massachusetts ran what appears to have been highly successful in-service training classes on English and science for teachers. He also had effective adult education classes and a successful piggery-poultry project. He seemed to blend into his community almost from the beginning, becoming one of the first volunteers to learn the dialect from his region and use it extensively. He enjoyed serenading at night with the gang from the *sari-sari* store and drank tuba with the older men who, as he put it "had the pleasure of learning they could drink the American under the proverbial table."†

These two cases teach us some useful things. Both volunteers genuinely joined their communities. They learned the language, sought to "burrow in." Most importantly, they accepted the Filipinos on their own terms and made friends with them, presumably long before their own understanding of the local culture had developed. D wrote, "The people are different, but willing to take me in. . . ." Somehow or other, the Filipino traits that so frustrated other volunteers were not an obstacle to these two. Instead, these two accepted not only the worth of the Filipinos but the worth of their ways, enough to practice them joyfully. And out of that long practice came D's remarkable statement that he was now able to feel *with* others.

Did the two volunteers "go native"? In a sense. Perhaps the most important respect in which this is true lies in the

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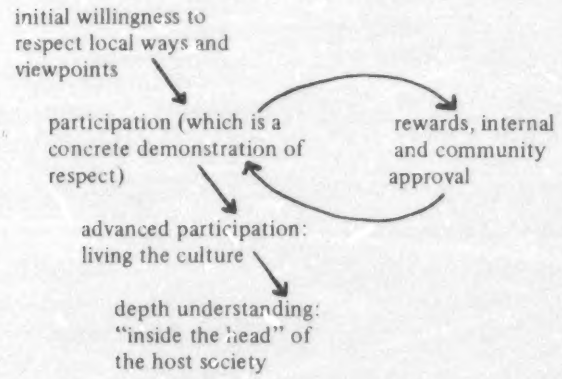
* Lawrence H. Fuchs, "The Role and Communication Task of the Change Agent – Experiences of the Peace Corps in the Philippines," in Daniel Lerner and Wilbur Schramm, eds., *Communication and Change in the Developing Countries* (Honolulu: East-West Center Press, 1967), pp. 242-245.

* Ibid., p. 253.

† Ibid., p. 250.

acceptance of the worth and authority of the local community's standards of conduct. These volunteers *participated* in Filipino life. That participation was reinforced in two ways. First, it must have been intrinsically enjoyable to these particular young men. It was satisfying to drink tuba with the local males. Second, that participation must have won social approval from the Filipinos *and that approval must have mattered* to these volunteers. Conceivably the approval of Peace Corps staff became less important (remember that D chose to shake off "entanglement" with the Peace Corps) as the approval of the local community became more important.

The sequence of events seems to go like this:


initial willingness to respect local ways and viewpoints
participation (which is a concrete demonstration of respect)
rewards, internal and community approval
advanced participation: living the culture
depth understanding: "inside the head" of the host society

It is worth noting that it was only after three years of intense, 24-hour-a-day experience that D felt that he was inside the Filipino head, seeing and feeling in Filipino ways. This, of course, should be no surprise, especially to Americans with their centuries of experience in the difficulties of immigrant assimilation. Stories of immigrants are replete with the difficulties of adjustment, the persistence of old-country ways and attitudes, the stress between parents and the children born in the new country. Many immigrants never made the cultural shift emotionally, even after decades of living in the new setting. But many did.

Respect and Participation – Missing Elements

What the Peace Corp examples – and the American immigrant experience – show us is that it is not easy to attain cross-cultural awareness or understanding of the kind that puts you into the head of a person from an utterly different culture. Contact alone will not do it. Even sustained contact will not do it. There must be a readiness to respect and accept, and a capacity to participate. The participation must be reinforced by rewards that matter to the participant. And the participation must be sustained over long periods of time. Finally, one may assume that some plasticity in the individual, the ability to learn and change, is crucial. In general, the young will be more flexible and able to achieve this.

This kind of cross-cultural awareness is not reached by tourists nor, in the days of empire, was it reached by colonial administrators or missionaries, however long their service on foreign soil. In American schools, despite integration and black and Chicano study programs, whites do not achieve such an awareness of minority world-views. The missing elements are respect and participation. The society offers limited gratifications for reinforcement of respect for minorities – and very limited penalties for disrespect. And it offers absolutely no rewards to those of the white majority who might seek to participate in minority behavior patterns. The situation for the minority groups is somewhat different; there are social rewards for participating in the majority culture and many individuals shuttle more or less successfully between the two worlds or work out some kind of synthesis.

Options

If cross-cultural awareness of a profound sort is extremely difficult to attain, what are the options? Are there lesser varieties of awareness that might nonetheless be said to contribute to a global perspective? Are there better methods than have typically been employed to reach awareness? Is the goal itself worthwhile, i.e. does cross-cultural awareness matter?

Let me talk to that last question first. Yes, cross-cultural awareness does matter, for the following major reason if for no other. Several million years of evolution seem to have produced in us a creature that does not easily recognize the members of its own species. That is stated in rather exaggerated form but it refers to the fact that human groups commonly have difficulty in accepting the humanness of other human groups.

> . . . we call a group of primitives in northern North America Eskimos; this name, originated by certain Indians to the south of the Eskimos, means "Eaters of Raw Flesh." However, the Eskimos' own name for themselves is not Eskimos but is Inupik, meaning "Real People." By their name they provide a contrast between themselves and other groups; the latter might be "people" but are never "real."*

This practice of naming one's own group "the people" and by implication relegating all others to not-quite-human status has been documented in nonliterate groups all over the world. But it is simply one manifestation of a species trait that shows itself in modern populations as well. It is there in the hostile faces of the white parents demonstrating against school busing. You will find it lurking in the background as Russians and Chinese meet at the negotiating table to work out what is ostensibly a boundary dispute. And it flares into the open during tribal disputes in Kenya.

It must, once, have been an adaptive trait. Perhaps, in ways that we now tend to deprecate, it still is. We call it chauvinism rather than self-esteem. Clearly, there are positive effects associated with a strong sense of group identity. Loyalty is a virtue everywhere, disloyalty abhorred everywhere. The inner harmony of groups is strengthened if aggression can be displaced, diverted to external targets. And if aggression is to be justified, then it helps if the enemy is not quite human. It helps even more if the enemy can be shown to be engaging in practices that are so outrageously different from one's own that they can be credibly labeled inhuman.

There was a time when the solidarity of small groups of

* Wendell H. Oswalt, *Understanding Our Culture* (Holt, Rinehart & Winston, Inc., 1970), p. 19.

humans was the basis for the survival of the species. But in the context of mass populations and weapons of mass destructiveness, group solidarity and the associated tendency to deny the full humanness of other peoples pose serious threats to the species. When we speak of "humans" it is important that we include not only ourselves and our immediate group but all four billion of those other bipeds, however strange their ways.

This is the primary reason for cross-cultural awareness. If we are to admit the humanness of those others, then the strangeness of their ways must become less strange. Must, in fact, become believable. Ideally, that means getting inside the head of those strangers and looking out at the world through their eyes. Then the strange becomes familiar and totally believable. As we have seen, that is a difficult trick to pull off. But there may be methods that will increase the probability of success. Further, there are lesser degrees of cross-cultural awareness than getting inside the head; these more modest degrees of awareness are not to be scorned.

Levels of Cross-cultural Awareness

We might discriminate between four levels of cross-cultural awareness as follows:

Level	Information	Mode	Interpretation
I.	awareness of superficial or very visible cultural traits: stereotypes	tourism, textbooks, National Geographic	unbelievable, i.e. exotic, bizarre
II.	awareness of significant and subtle cultural traits that contrast markedly with one's own	culture conflict situations	unbelievable, i.e. frustrating, irrational
III.	awareness of significant and subtle cultural traits that contrast markedly with one's own	intellectual analysis	believable, cognitively
IV.	awareness of how another culture feels from the standpoint of the insider	cultural immersion: living the culture	believable because of subjective familiarity

At level I, a person might know that Japanese were exaggerated in their politeness and gestures of deference. At level II are those who know, either through direct or secondhand experience, of cultural traits that significantly (and irritatingly) contrast with one's own practices. The French in their relations with some Indian tribes and the Peace Corps volunteers who failed to adjust might be at this level. So, too, might those who despair over the seeming inability of many developing countries to control population growth. At level III are those who might know, for example, that the really distinctive aspect of the Japanese social hierarchy has nothing to do with the forms of politeness but rather exists in the keen sense of mutual obligation between superior and inferior. The level III person accepts this cultural trait intellectually; it makes sense to him. Peace Corps volunteers might have had this kind of intellectual understanding before actual contact with host cultures. After that contact, some of them slipped to level II and some moved to level IV.

According to this scheme, "believability" is achieved only at levels III and IV. And I have argued that believability is necessary if one group of humans is to accept other members of the biological species as human. I have also noted the rigors of the climb to level IV. This seems to leave level III as the practical goal. But is level III enough?

My position is that level III is indeed more attainable than level IV, and it is a reasonably worthy goal. But not quite enough. We should try to attain at least some aspects of level IV awareness. We can. There are new methods to be explored. And there is a more general reason for encouragement. The evolutionary experience that seemed to freeze us into a small-group psychology, anxious and suspicious of those who were not "us," also made us the most adaptive creature alive. That flexibility, the power to make vast psychic shifts, is very much with us. One of its manifestations is the modern capacity for empathy.

Beyond Empathy

Daniel Lerner in *The Passing of Traditional Society* writes:

> Empathy . . . is the capacity to see oneself in the other fellow's situation. This is an indispensable skill for people moving out of traditional settings. Ability to empathize may make all the difference, for example, when the newly mobile persons are villagers who grew up knowing all the extant individuals, roles and relationships in their environment. Outside his village or tribe, each must meet new individuals, recognize new roles, and learn new relationships involving himself. . . .
>
> . . . high empathic capacity is the predominant personal style only in modern society, which is distinctively industrial, urban, literate and participant. Traditional society is nonparticipant – it deploys people by kinship into communities isolated from each other and from a center . . .
>
> Whereas the isolate communities of traditional society functioned well on the basis of a highly constrictive personality, the interdependent sectors of modern society require widespread participation. This in turn requires an expansive and adaptive self-system, ready to incorporate new roles and to identify personal values with public issues. This is why modernization of any society has involved the great characterological transformation we call psychic mobility . . . . In modern society *more* individuals exhibit *higher* empathic capacity than in any previous society.*

If Lerner is correct, modern populations have a dramatically different outlook, a dramatically different readiness for change, than traditional populations. That difference must have been learned – and by millions of people. If the latent capacity for empathy can be learned or activated, then it may not be too much to work toward a psychic condition that reaches a step beyond empathy. Magoroh Maruyama, an anthropolgist–philosopher, describes that next step as *transspection.*

* Daniel Lerner, *The Passing of Traditional Society* (Free Press, 1958), pp. 50, 51.

> Transspection is an effort to put oneself in the head . . . of another person. One tries to believe what the other person believes, and assume what the other person assumes. . . . Transspection differs from analytical "understanding." Transspection differs also from "empathy." Empathy is a projection of feelings between two persons with one epistemology. Transspection is a trans-epistemological process which tries to learn a foreign belief, a foreign assumption, a foreign perspective, feelings in a foreign context, and consequences of such feelings in a foreign context. In transspection a person temporarily believes whatever the other person believes. It is an understanding by practice.*

Empathy, then, means the capacity to imagine oneself in another role within the context of one's own culture. Transspection means the capacity to imagine oneself in a role within the context of a foreign culture. Putting Lerner and Maruyama together we might chart the psychic development of humanity as follows:

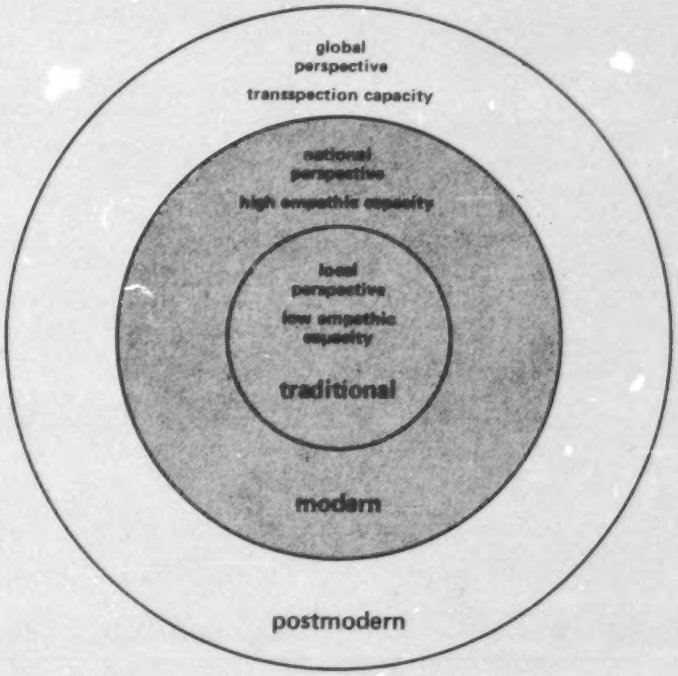
Traditional peoples	unable to imagine a viewpoint other than that associated with fixed roles in the context of a local culture
Modern peoples	able to imagine and learn a variety of roles in the context of a national culture
Postmodern peoples	able to imagine the viewpoint of roles in foreign cultures

* Magoroh Maruyama, "Toward a Cultural Futurology," Cultural Futurology Symposium, 1970 American Anthropological Association national meeting, published by Training Center for Community Programs, University of Minnesota.

Or, we might show the sequence of development in a more graphic way, as involving a movement from the constrictions of local perspectives through the expanded psychological flexibility necessary for role learning in large, heterogeneous national societies, to the advanced versatility of "global psyches" that travel comfortably beyond the confines of the home culture. (The gray zone is home culture.)

The modern personality type did not develop because it was planned. It emerged in the context of changing social conditions. The postmodern personality type, similarly, is not likely to be produced by educational strategies. But if there is a broad social movement, an essentially unplanned intensification of human interaction on the world stage, then educators and other interested parties can play their minor but nonetheless useful roles in the unfolding drama. For educators, that will mean providing students with maximum experience in transspection. And maximum experience means more than time. It means a climate in which transspection is facilitated and expected – and in which the expectations are reinforced. Under such circumstances the schools might produce a slightly higher proportion of persons with the kind of psychic mobility displayed by D, the Peace Corps worker who could feel *with* others. That would be a gain.

If more and more individuals reach the vantage point of level IV awareness there will be another kind of gain. Dispelling the strangeness of the foreign and admitting the humanness of all human creatures is vitally important. But looking at ourselves from outside our own culture is a possibility for those who can also see through the eyes of the foreigner – and that has significance for the *perspective consciousness* discussed earlier. Native social analysts can probe the deep layers of their own culture but the outside eye has a special sharpness; if the native for even a moment can achieve the vision of the foreigner he will be rewarded with a degree of self-knowledge not otherwise obtainable.



Knowledge of Global Dynamics

some modest comprehension of key traits and mechanisms of the world system, with emphasis on theories and concepts that may increase intelligent consciousness of global change

How does the world work? It is a vast, whirring machine spinning ponderously around a small yellow sun? Is there a lever we can push to avert famine in South Asia, or one that will cure world inflation, or one to slow the growth of world population? Is it our ignorance of which levers to move that results in tragedy and crisis? Is it our ignorance of how the gears intermesh that causes breakdowns in the stability of the system?

Or is the machine useful as a metaphor? Is it perhaps better to think of the world as an organism, evolving steadily in response to the programing in its germ plasm? Are wars and famines merely minor episodes in the biological history of a planet serenely following a script already written?

The latter view is not a comfortable one for people in industrial societies, raised to believe that almost anything can be engineered, including the destiny of the world. But the machine image doesn't quite work, either, although we continue (as I have done) to speak of "mechanisms." The idea of a machine suggests an assembly of parts that interconnect in a very positive fashion, so positive that when you manipulate one part you get immediate, predictable, and quantifiable response in other parts. That does not seem to describe the world as we know it.

But both machines and organisms are systems of interconnected elements and it is the idea of *system* that now prevails. How does the world work? As a system. What does that mean? It means we must put aside simple notions of cause and effect. Things interact, in complex and surprising ways. "Effects" loop back and become "causes" which have "effects" which loop back . . . . It means that simple events ramify – unbelievably.

The World as a System

The world as a system, is it well understood? Are the interactions, however complex, charted and analyzed? Not yet. But the dynamics of the world system are under intensive investigation, frequently in the context of policy planning by governments and corporations. These ask their advisors. "What will happen if we make decision A as opposed to decision B?" There are a number of strategies for answering that kind of question, but the world conceived as a system is intrinsic to all of them. This kind of experience and other studies have generated a small body of knowledge about important factors in the world system and about the dynamics of the system – how the elements interact. Many aspects of that knowledge are very technical and beyond general understanding, but certain concepts and principles are reasonably accessible. Some – like the concept of feedback – are already making their way into the domain of popular knowledge. Other ideas, with a bit of effort and ingenuity, can be put within the reach of non-specialists.

These ideas will have considerable value as constituents of a global perspective, primarily because they replace simplistic explanations and expectations with more sophisticated explanations and expectations. For example, the simplistic explanation of high birth rates in some of the less developed countries is lack of education and lack of technology. People don't know how to control reproduction and they lack the means to do so. The solution, then, is to add information and birth control devices. The systems view, by contrast, is that there are more factors operating in the situation than one initially imagines. And you'd better find them and figure out how they connect to the other factors. That assumption of hidden complexity alters radically the interpretation of global phenomena. It reduces the likelihood of contempt for those peasants who, strangely, do not seize the opportunity to limit family size. And it improves the long-range possibilities for real control of the situation.

The systems view in itself, however, does not guarantee that hidden or subtle factors will automatically be revealed. For that we must turn to a variety of independent inquiries which have attempted to isolate and measure such factors. Many of these studies have been part of the general movement in recent years to understand and facilitate economic development. Why have some countries leapt ahead of others in economic productivity? Why is there resistance to technical innovation in some situations, acceptance in others? The more conventional answers to these questions have been increasingly challenged by explanations that involve factors of culture and psychology, such as patterns of motivation and cognition. Perhaps these newer explanations deserve no

special standing, but they do direct the attention to factors *that are not ordinarily considered.*

This is worth noting. Because it is also true of systems thinking. The results of thinking in systems terms often offend what we like to call common sense. Similarly, the newer explanations ask us to believe things about ourselves and others that fall outside the ordinary repertoire. We must learn not only to accept the intricacies of system interactions but the influence of cultural expectations and cognitive states that we do not usually sense. The implication is this: much of what should be learned about global dynamics will not be learned in informal and nonformal settings, i.e. the media's view of how the world works cannot be counted on to incorporate our best knowledge of how the world works. So we must use the schools to transmit that knowledge. This is appropriate because the knowledge is technical, and it is necessary because the knowledge often runs against the grain of common belief and thus requires special justification. The classroom, with all its limitations, is a reasonably good environment for mastering the technical and legitimating the new and strange.

The School and Global Dynamics

But let's begin to talk in more concrete terms. What exactly might the schools teach about global dynamics? The answer proposed here is very selective, with the criterion of selection being, Does the particular learning contribute to an understanding of global change? Because the control of change is the central problem of our era. There are changes we desire and seem unable to attain. And there are changes we wish to constrain and, as yet, cannot. There is also another kind of change – in spite of our difficulties we are growing in our capacities to detect and manipulate change. A global perspective that fails to comprehend both the problems of change and the promise of improved control will not be worthy of the name.

Three categories of learning about change suggest themselves:

I. Basic Principles of Change in Social Systems

- the ramifications of new elements in social systems
- unanticipated consequences
- overt and covert functions of elements
- feedback, positive and negative

II. Growth as a Form of Change

- desired growth in the form of economic development
- undesired growth in the form of exponential increase in population, resource depletion, etc.

III. Global Planning

- national interests and global planning
- attempts to model the world system as related to national policy formulation

Principles of Change

As stated, these are dry bones. So let's put some flesh on them, beginning with the question of how students might learn some basic principles of change. One of the most important and illuminating principles is that

things ramify

Suppose there is a pond. In the pond and around it live several hundred species of animals and plants. One day a new species is introduced to the pond habitat. What will happen? The innocent view is that you have simply added something. You had several hundred species; now you have one more. By contrast, the educated view is that the introduction of a new species to the pond system may bring profound changes. The population of some species may dwindle, others explode; some may perish altogether. The new species may have such effects because it disturbs complex relationships that had achieved some degree of equilibrium. The new element sends shock waves through the entire system because the habitants of the pond environment are bound up with one another; wherever and however the new element enters the life of the pond, the effects will ramify through the system.

Social systems operate in equivalent ways. Consider the case of the Papago Indians of Southern Arizona. Around the turn of the century Indian agents began to provide the Papago with farm wagons. Until that time, the primary means of transporting goods had been the horse, used as a pack animal.

> Papagos had their own methods of packing. They made saddles of two cylindrical bundles of wheat straw or grass tied together with leather thongs and slung so that one rested on each side of the horse's back. Goods to be transported were put in panniers, made of fiber or rawhide nets, which were slung over the strawpack saddles. . . .
>
> The Indians customarily changed their residence with the season. During the winter months they lived in the mountains, where there were permanent supplies of water in the form of springs. In the summer they moved down into the valleys to plant and harvest crops of corn, beans, and wheat. The winter and summer villages were from 6 or 8 to 15 or 20 miles apart.
>
> Trading expeditions were frequently organized by the Papagos for the purpose of obtaining seeds to plant. . . . Buckskin, grass rope, large baskets, and pottery ollas were the usual trade goods. Papago traders sometimes went as far as 250 miles on such expeditions–reaching Bisbee, Arizona, and Hermosillo, Sonora. . . .
>
> Papago villages were small, rarely consisting of more than a hundred people, and were organized as land-using, political units, laying claim to some permanent water supply in the mountains and to an area of arable fields in the valley. Usually a *charco*, a large dirt-banked reservoir, held the domestic water supply for a field village during the summer months. . . .
>
> Hardly any surplus was produced in the desert villages, and there was no full-time specialization of labor. All the men, including even the curing and diagnosing shamans, worked in the fields. They took care of the horses and managed their packing, and most men could engage in the simple crafts of leather and woodworking. Women, besides cooking and performing other

household duties, were part-time specialists in pottery-making and basketry. The older boys and girls gathered wood from round about the village, armload by armload, and also carried the water in ollas from the *charcos* or springs to the houses.*

Then came the wagon, which was welcomed by the Papago even as it began to transform their lives. The wagon was a thing of iron and wood. Keeping it in repair required iron-working, so a new skill and a new role for males developed, that of blacksmith. On the other hand, the skills of making panniers and pack saddles fell into neglect since packing goods on individual horses was no longer necessary.

The wagon made it possible to haul water from the reservoirs to the households in large metal barrels, which gradually replaced the clay ollas. The female craft of making ollas became much less important and the women devoted less time to it.

The wagon was also a convenient means of hauling firewood. The men began to cut wood in large quantities, replacing the random gathering of women and children. Some of the wood was sold in nearby towns and this stimulated interest in the possibility of selling surplus corn and wheat to townspeople. Thus the Papago began to move more actively into the cash economy of the area. Although contact with local towns increased, trading contact with Mexicans decreased in terms of numbers of Papago males involved. One or two men on the wagon could make the trading expedition in place of the much larger number of men and horses previously required.

And the wagon had an effect on community solidarity.

> Acceptance of the wagon as a resource of the whole village under joint management was surely not a part of the expectation of the Indian agent. He probably thought in terms of individual ownership. What happened was an adjustment to the existing social organization and property concepts of the Papagos. The village headman brought the wagon into the culture as a unique resource, like the land, the use of which must be shared. This sharing led to the new group activity of road-building, in accordance with the same pattern as land improvements.†

Things ramify. A new element is introduced. Technologies disappear or decline. The sexual division of labor changes. New skills are learned. Old patterns of contact with outsiders erode, new patterns emerge. Community activities find a new focus. The effects of a lowly farm wagon on a packhorse culture.

The Papagos and their wagon seem remote from us now. And not, perhaps, very important. But cases like this document the natural behavior of social systems in useful ways. From such cases students can learn not only that new elements have the power to alter whole systems but that there are inevitably unanticipated consequences. The Papagos wanted the wagon. They had practical tasks clearly in mind. And it served many of their intentions. But it seems unlikely that they intended the destruction of certain traditional crafts, or a new division of labor, or increased participation in the region's cash economy. If they had wished for any of these effects, it seems just as improbable that the wagon would have been chosen as the instrument for bringing them about. And yet, it was the instrument.

Partly because our understanding of complex social systems is limited, surprise continues to be the rule. Carroll Pursell, a historian who specializes in American technology, puts it this way: there are always more effects than intended. To a considerable extent we have traditionally tended to blind ourselves to this fact. We have dismissed those unintended consequences as "side effects," as if they are of minor importance. But the "side effects" are often the most important effects. In recent years the ecology movement has performed a major job of consciousness raising in this regard. There are now laws and regulations that require organizations to anticipate and assess the environmental consequences of their activities. A new level of consciousness is thus reinforced by government fiat. There are no equivalent pressures to examine other kinds of impact, but sensitivity is growing. What the society is learning is that

> *there are no "side effects" but*
> *there are surprise effects*

What this rule says is that when you intervene in a social system be prepared for surprising consequences too profound to be dismissed as "side effects."

The extent to which consequences can be both surprising and profound is nicely demonstrated by the case of bottle-feeding technology. It is an article of faith in the developed countries that "modern" practices are superior to "traditional" practices, and that if less developed lands will incorporate modern practices the lives of their peoples will be improved. The bottle-feeding of infants is a modern practice involving special containers and nipples and commercially marketed "formulas," most of which must be mixed with water. In recent years bottle-feeding has become a symbol of modern sophistication in developing countries, although it is beginning to lose its appeal in the countries where it has its origins.

> In the United States, the breast has been gradually transmogrified from its nutritional role into a cosmetic and sexual symbol so potent that an American woman may no longer nurse her baby in public. The trend is beginning to reverse: over the last decade there has been a grass-roots movement to resume breast-feeding, a back-to-nature reaction against the unwarranted intrusion of technology into an intimate aspect of family life. Ironically, just when American mothers are putting babies back to the nipple, women in under-developed countries are imitating in droves the Western fad for the bottle.*

What are the consequences of bottle-feeding for the people of developing lands? Economic loss, for one thing.

> Twenty years ago, 95 percent of Chilean mothers breast-fed their children beyond the first year; by 1969, only 6 percent did so, and only 20 percent of the babies were being nursed for as long as two months. Potential breast milk production in Chile in 1950 was 57,700 tons, of which all but 2900 tons, or 5 percent, were realized. By 1970, 78,600 tons (or 84

* Edward H. Spicer, ed., Human Problems in Technological Change (John Wiley & Sons, 1967), pp. 25, 27.

† Ibid., p. 31.

* Nicholas Wade, "Bottle-Feeding: Adverse Effects of a Western Technology," *Science*, April 5, 1974, pp. 45-48.

A global perspective appropriate to the times must include . . . insight into particular patterns of change, those most characteristic of the times.

percent) of 93,200 potential tons were unrealized. The milk of 32,000 Chilean cows would be required to compensate for that loss.*

Bottle-feeding tends to be an urban phenomenon in developing countries although declines in breast-feeding are also reported in rural areas. Even when calculated only for urban populations the losses are substantial.

> An estimated 87 percent of the world's babies are born in the developing countries, about a quarter of them in urban areas. If 20 percent of the estimated 27 million mothers in urban areas do not breast-feed, the loss in breast milk is $365 million. If half of the other 80 percent do not continue to breast-feed after the first six months, the total loss reaches $780 million. These estimates, however, clearly understate the situation; losses to developing countries more likely are in the billions.†

These figures do not adequately depict the losses in personal terms. The poor cannot afford to buy much of anything; they especially cannot afford to buy what they do not need. A poor woman persuaded that bottle-feeding is superior to breast-feeding is simply being robbed; henceforth she denies her child the superior nutrition she possesses and allocates scarce resources for the purchase of inferior nutrition.

The child is also being robbed, possibly of life itself. Formulas must be mixed with water and local water supplies are often contaminated. Severe diarrhea is much more common in bottle-fed babies than in those who are breast-fed.

> According to a 1970 study in San Salvador, three-quarters of the infants who died from the end of the first through fifth month had been breast-fed less than thirty days, if at all; of those who died in the last half of the first year of life, slightly over half had been breast-fed less than a month. . . . Deaths of children from diarrheal diseases (which are usually nutrition related) in Recife, where only 22 percent of the children were breast-fed at least one month, were nearly three times the rate in Kingston, where the corresponding figure is 73 percent.**

Even when children do not lose their lives they – and their society – may lose a portion of their human potential. Adequate nutrition is crucial to the full development of the brain and it is especially important in the early months of life. As breast-feeding has declined, the average age of children suffering severe malnutrition has dropped from eighteen months to eight months. Malnutrition at that early age often leaves permanent handicaps.

There is another consequence of bottle-feeding. Nursing mothers are less likely to become pregnant. In societies where breast-feeding is common, births are spaced more widely. Lactation is a kind of birth control, and bottle feeding removes this natural constraint.

Economic loss, infant mortality, improper brain development, population growth. Surprising and profound consequences of a minor technology introduced to the developing peoples of the world. The commercial food companies intended only to expand their markets and increase their profits. The governmental agencies with their dry milk feeding programs intended only to improve nutrition. But the consequences ramified beyond and in some respects contrary to intentions. That has been the common experience of those who seek to change even the smallest elements of social systems.

Much of the difficulty in anticipating consequences originates in the failure to discern the complex functions of system components. Breast-feeding has a very obvious function: to provide nutrition for the infant. But it has taken much research to show that there are special factors in that nutrition which build the body's immunity systems and thus guard against disease throughout life. Another hidden function of breast-feeding, as mentioned above, is birth spacing. Thus, there are obvious functions and less obvious, concealed or unknown, functions. When we remove a component from a system we are unplugging not only the obvious connections but often inadvertently tearing loose the concealed wiring of all those other functions. The best – and often the most painful – way to learn all the functions of a component is to remove it from the system. That, in effect, is what happened when bottle-feeding supplanted breast-feeding in the developing countries. We now know much more about the complex functions of breast-feeding.

Sometimes, of course, the concealed wiring is not very concealed. People know about it, at least intuitively. This is one explanation for resistance to change. People realize that a seemingly small change will turn their world upside down. A classic case of this is described by Elting Morison in *Men, Machines and Modern Times.* At about the turn of the century the American naval bureaucracy was resisting the efforts of a young officer to introduce a new kind of gunsight pioneered by an English admiral. The new gunsight called for a new system of gunnery, called continuous-aim firing, and was much more accurate. Using the old system the Navy had fired 9500 shots during the Spanish-American War and registered 121 hits. But we had won the war, so why change the system? Under the new system, by contrast,

> . . . one naval gunner made fifteen hits in one minute at a target 75 by 25 feet (at a range of 1600 yards); half of them hit in a bull's-eye 50 inches square.*

Eventually, the young officer won his case but only after

* Alan Berg, *The Nutrition Factor* (Brookings Institution, 1973), p. 90.

† Ibid., pp. 92, 93.

** Ibid., pp. 94, 95.

* Elting E. Morison, *Men, Machines and Modern Times* (M.I.T. Press, 1966), p. 22.

the intervention of President Roosevelt. Why the resistance? Here is how Morison explains it.

> The opposition, where it occurs, of the soldier and the sailor to such change springs from the normal human instinct to protect oneself, and more especially, one's way of life. Military organizations are societies built around and upon the prevailing weapons systems. Intuitively and quite correctly the military man feels that a change in weapon portends a change in the arrangements of his society. . . . In the days when gunnery was taken lightly, the gunnery officer was taken lightly. After 1903, he became one of the most significant and powerful members of a ship's company, and this shift of emphasis naturally was shortly reflected in promotion lists.*

Morison's hypothesis seems eminently reasonable, i.e. it is quite likely that there are times when people intuitively understand the complexity of their social arrangements and the fragility of those arrangements. There are surely other times when such understanding is lacking and people single-mindedly pursue narrow goals without anticipating any effect except the achievement of those goals. In trying to understand change and resistance to change both possibilities must be kept in mind. But perhaps the most useful adjunct to our understanding is the rule that reminds us metaphorically of the multiple and often hidden functions of elements in a system:

look for the concealed wiring

Suspect, in other words, that the obvious function of the element is not its only function; track down those other functions. The obvious function of a naval gunsight is to aim a gun. The hidden function of that naval gunsight was to serve as the technological base of a social hierarchy. Proof? Change the gunsight and watch the hierarchy change.

Let's take stock. Three rules have been proposed:

things ramify

there are no "side effects" but there are surprise effects

look for the concealed wiring

Do these contribute to an understanding of change in social systems? In a small way, perhaps. The first two rules constitute a prescription for caution and humility. They say, "Watch out, consequences can be unexpected and profound." The third rule helps to explain the reasons for that caution and humility – the connections that tie the system together are complex and to some extent hidden from view.

Technological Innovation and Change

But we need to know more. A global perspective appropriate to the times must include not only general principles but insight into particular patterns of change, those most characteristic of the times. The cases sketched above – the Papago and their innocent acceptance of the farm wagon, the Navy bureaucrats' resistance to the new gunsight, the destructive effects of bottle-feeding – are small episodes in a worldwide movement that has been building for several centuries. This movement undergirds what might be called the *technological innovation* pattern of change. There are two elements in this pattern: the generation of new technology and the diffusion of technology from one society to another. Since World War II this has been an especially powerful pattern in the world. The reconstruction of war-devastated lands and the emergence of proud but poor new nations called forth major programs in technical assistance. The economic redevelopment of the industrial countries that "lost" the war enabled fresh starts and engineering breakthroughs; Japan, for example, jumped ahead in steel, shipbuilding, and electronics. The Cold War stimulated high technology developments in nuclear weapons, biochemistry, space capabilities, computers. Educational institutions produced increasing numbers of scientists and engineers to feed the growing demands of governments and corporations. Billions allocated to R & D (research and development) assured their employment. And other billions were allocated over the years to technical aid, to transfer advanced technology from the "haves" to the "have-nots."

The rapid pace of technological development and its diffusion shapes and shakes our lives. But we hardly notice. We cannot imagine living under other circumstances. Like riders in a racing car our senses are dulled by the roar of our passage and we do not feel our speed.

Is it possible to become more aware of this pattern of world change – the continuing revolution in technology that transcends all ideologies and undermines all traditions? If so, to what purpose? Will increased awareness bring increased control? That will depend to some extent on the nature of the awareness. The desirability of technological innovation has not been questioned until very recently. Now there is a questioning attitude, with respect to environmental consequences. But there is only slight attention to other kinds of effects. In general, the benefits of technological change continue to seem concrete and immediate, the risks tenuous and distant. Confidence in technological solutions remains high, particularly in the developed countries.

Under these circumstances, gains in awareness will require very focused effort. I would suggest three targets. First, young people should be sensitized to the **global consequences of technological decisions** which *seem* to be the legitimate responsibility of the individual, or corporation, or nation. Stratospheric ozone depletion is a case where individual indulgence in a minor convenience and corporate interests in the sales of that convenience may be leading to a condition of global peril. There are similar cases worthy of study.

Second, students must be encouraged to imagine what has hitherto been unimaginable – **the abortion of certain technologies.** We need some classroom games and simulations in which the central task is to decide about pulling the plug. Like the psychopathic computer in the film "2001," the machines and their advocates will threaten and mutter as the process of disconnecting them proceeds. The nuclear energy industry, which is a prime candidate for abortion because of the totally unresolved problem of radioactive wastes, can be

* Ibid., pp. 35-37.

expected to go down fighting. The readiness to contemplate abortion of selected technologies will be facilitated by knowledge of alternatives, some themselves technological, some involving new institutions and values. The "need" for nuclear energy, for example, rests on certain assumptions about the inevitability and sanctity of economic growth, and the availability of alternate energy resources. These assumptions are not inviolate; we should be willing to entertain alternative assumptions.

Which brings us to the third and most important awareness – that our beliefs about the naturalness and the goodness of **technological change** are related to our beliefs about the naturalness and goodness of **economic growth**. The belief in the desirability of economic growth comes close to being a universal secular religion. Advanced industrial countries, however wealthy, pray that growth will continue and view temporary interruptions as calamities. The less developed countries pray at the altar, too, hoping to achieve rates of economic growth that will more than match rates of population growth. Sophisticated technology and continued advances in sophisticated technology are widely viewed as the necessary instruments of this growth. In advanced economies the movement is in the direction of automatic machinery and the gradual phasing out of tasks requiring human labor and human thought. In the developing countries the problem of production is seen in terms of machines that will amplify human labor, chemicals that will increase the fertility of land and suppress insect pests, and transportation that will link the hinterland to markets.

It seems unarguable that developing countries should seek and be helped to improve the material conditions of life and particularly to eliminate the direst kinds of poverty and suffering. Growth that will provide adequate nutrition, health care, and shelter is not to be despised. That means increases in agricultural productivity at the least, developments in transportation and communication, possibly major efforts to develop and improve industrial production. But improved living standards may also come by improvements in the social arrangements through which people obtain the necessities of life.

The belief in the desirability of economic growth comes close to being a universal secular religion.

How do you help developing countries grow? The dominant Western model calls for increased use of complex machines and the training of technicians to operate and maintain them. Apply the knowledge of scientific experts. Use the latest variety of seeds, even though they require irrigation and heavy application of chemical fertilizers and pesticides. The main thing is to increase production through efficient use of all the factors that contribute to output – tools, resources, labor, knowledge.

The Western model of economic growth is strongly oriented by the value of efficiency and by the goal of maximum production. It does not attend, typically, to the problem of equitable distribution. The ruling assumption is that if productivity rises everyone in the society will benefit, at least to some degree. There is another model of growth, represented by the ideology of Mao's China:

> The Maoists' disagreement with the capitalist view of economic development is profound. . . . Maoists believe that while a principal aim of nations should be to raise the level of material welfare of the population, this should be done only within the context of the development of human beings, encouraging them to realize fully their manifold creative powers. And it should be done only on an egalitarian basis – that is, on the basis that development is not worth much unless everyone rises together; no one is to be left behind, either economically or culturally. Indeed, Maoists believe that rapid economic development is not likely to occur *unless* everyone rises together. . . .
>
> While they recognize the role played by education and health in the production process, their emphasis is heavily placed on the transformation of ideas, the making of the communist man. . . . The Maoists believe that economic development can best be promoted by breaking down specialization, by dismantling bureaucracies, and by undermining the other centralizing and divisive tendencies that give rise to experts, technicians, authorities and bureaucrats. . . . Maoists seem perfectly willing to pursue the goal of transforming man even though it is temporarily at the expense of some economic growth. Indeed, it is clear that Maoists will not accept economic development, however rapid, if it is based on the capitalist principles of sharp division of labor and sharp (meaning unsavory or selfish) practices. . . .
>
> While capitalism, in their view, strives one-sidedly for efficiency in producing goods, Maoism, while also seeking some high degree of efficiency, at the same time and in numerous ways builds on "the worst": experts are pushed aside in favor of decision-making by "the masses"; new industries are established in rural areas . . . expertise (and hence work proficiency in a narrow sense) is discouraged; new products are domestically produced rather than being imported "more efficiently"; the growth of cities as centers of industrial and cultural life is discouraged. . . .
>
> Of course, Maoists build on "the worst" not because they take great delight in lowering economic efficiency; rather, their stated aims are to involve everyone in the development process, to pursue development without leaving a single person behind, to achieve a balanced growth rather than a lopsided one. . . .*

The Western model of growth has significant achievements to its credit, but does not always travel well when applied to the problems of the less developed countries. It creates new scientific and technical elites in countries which may be fran-

* John W. Gurley, "Maoist Economic Development: The New Man in the New China," in Charles K. Wilber, ed., *The Political Economy of Development and Underdevelopment* (Random House, 1973), pp. 308-310, 312.

tic to lay aside a societal structure controlled by elites. It fosters new dependencies, not the least of which is a dependency on fossil fuels. And it is based on an ethic of individual striving and achievement that often runs counter to the mode of groups which treasure cooperative social activities and goals. Most important is the primacy of growth itself – the ultimate goal is an unceasing expansion in the production of goods and services. In the service of that goal technological progress is viewed as an unblemished asset.

The Maoist model subordinates growth to other considerations: equitable distribution of material benefits, collective participation, the denial of legitimacy as well as opportunity for self-striving, localism, and inventiveness by nonexperts. Nonetheless, growth is important there also, and has been achieved. The Maoist model may travel no better than the Western model but on the home grounds there seems to have been substantial success. China is still "underdeveloped" with a per capita GNP of perhaps $160 but:

> The basic, overriding economic fact about China is that for twenty years she has fed, clothed and housed everyone, has kept them healthy, and has educated most. Millions have not starved; sidewalks and streets have not been covered with multitudes of sleeping, begging, hungry, and illiterate human beings; millions are not disease-ridden. To find such deplorable conditions, one does not look to China these days but, rather, to India, Pakistan, and almost anywhere else in the underdeveloped world.*

China's contrast with other sectors of the less developed world is striking, but the contrast with the values and strategies of the Western industrial world is no less striking. For those seeking cross-cultural perspective on growth and development Mao's China offers a superb curriculum.

Let me stop for a moment to review. The dimension under discussion is that of global dynamics, with an emphasis on principles, patterns, and mechanisms of change. A few cautionary principles of systems change were illustrated. Then I argued that an understanding of global change required not only the guidance of principles but awareness of certain dominant patterns of change in the real world. One such major pattern was *technological innovation*. I suggested that consciousness of that pattern required, among other things, a recognition of the link between ideas about technology and ideas about growth. The almost universal commitment to growth was noted, as was the existence of a major society – China – now practicing a form of development in which growth, while important, is subordinated to other values.

What I have not yet said, at least directly, is that growth itself is perhaps *the* most significant change in the contemporary world. It manifests itself in the form of increases in the absolute numbers of human beings, in the size of political units, in the productivity of goods and services, in the intensity of interactions among human groups. These forms of growth depend on other forms of growth – increases in the consumption of resources, in the extension and grip of political authority, in the organizational management of people and things. And they spawn yet another form of growth – increases in the waste products of human activity, thermal pollution of the atmosphere, chemical pollution of air, land, and water.

Growth, then, has two faces. There is the smiling face that promises improvements in material welfare. And there is a tragic face that we have preferred not to see. Some who have recently dared to look upon it say that it too holds a promise. The promise that growth in the human population, growth in the consumption of resources, growth in pollution, cannot continue for very much longer. The limits have almost been reached.

That diagnosis or warning has been circulating for some time. Harrison Brown worried about it in *The Challenge of Man's Future* in the 1950s. A more dramatic form came several years ago with the publication of *The Limits to Growth*. This was the report of a research team at the Massachusetts Institute of Technology sponsored by the Club of Rome. Using a great deal of data, and positing specific quantitative relationships among factors, the team projected productivity, population, resource, and pollution figures into the next century. The graphs spewed out by the computer were shocking. Several important mineral resources were on the verge of exhaustion; in practical terms, for example, zinc and tin ore might be unavailable within twenty years, and petroleum would last only another half century. There were other supply problems. Arable land is a finite resource. At present rates of productivity, agriculture can support perhaps eight billion people. The world could have that many people shortly after the turn of the century. Increase productivity? O.K. But if population growth rates continue, that only delays the day of reckoning for a few decades. By the middle of the 21st century the human race would have banged its head against a hard and final wall – no further increases in food possible from agriculture as we know it.

Growth itself is perhaps *the* most significant pattern of change in the contemporary world.

Limits scared people and they sought reassurance. It was available, abundant, and free. But events and new studies tend to bear out some of the grim forecasts of the *Limits* analysis. A very recent study by Mesarovic and Pestel* looks at the future of the world system region by region. Various scenarios, testing the effects of different policies, were played out on the computer. The results for one region – South Asia – were especially tragic *unless* population growth could be quickly halted and *unless* the region could be given massive help in industrializing its regional economy. Since

* Ibid., p. 315.

* Mihajlo Messarovic and Eduard Pestel, *Mankind at the Turning Point* (E. P. Dutton & Co., Inc./Reader's Digest Press, 1974).

these two conditions are not likely to be met, the tragic scenario will probably be played out – with real actors.

I have suggested that a global perspective should include some understanding of change, and that growth may be the dominant form of change in the contemporary world. That sounds academic and not particularly important. What the *Limits* and Mesarovic-Pestel studies assert, however, is that growth is of critical importance. The central message of these studies is awesome. It goes something like this: *Before very long the world system is going to break down. That doesn't mean total catastrophe but it does mean that the system will suffer some terrible shocks. The reason for the impending breakdown is that population, resource consumption, and pollution are growing exponentially. Since the world population is already large, since many nonrenewable resources are almost used up, since the environment's capacity to absorb pollutants is already strained, such growth cannot be considered benign. Exponential growth is treacherously rapid and will bring us to the earth's finite limits – and thus to a condition of severe stress – within a few generations.*

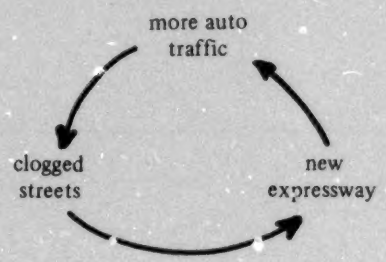
Schools and the Issue of Growth

This is an important message. It may not be entirely accurate in its analysis, but as a warning of probable danger it deserves wide dissemination. By all agencies, including the schools. The young as well as the rest of us need to be apprised of the situation.

My impression at the moment is that issues of growth are not commonly found in the schools' curricula. This is not too surprising. There needs to be a context, a persistent context. Not just the occasional spasm of interest in this problem and that. And there needs to be some consensus in influential quarters that growth can be thought about, questioned, planned. In other words, this is an issue open to rational thought and thus a proper subject for inquiry in those of our institutions that teach and subscribe to reason. The problem of a context will be solved if teaching for a global perspective begins to play a larger part in the orientation of curricula – and there are other possible contexts if that does not occur. The problem of legitimacy is, I think, on the way to being solved by events and by the convergence of several broadly based social movements. The environmental and countercultural movements of the late sixties and early seventies hammered away at the values that undergird the cult of growth. Energy politics in the last few years has shaken the serenity of true believers previously untouched by the protest movements. The movements forced people to look at subtle costs of growth hitherto ignored. The rise in the price of oil forced even the hardiest capitalist to think twice about the conventional costs. So awareness has to some extent already been raised, doubts have been uttered, and it no longer requires bravado or ideological intemperance to think about growth. The underlying commitment of the society (ours and most others) to growth will doubtless continue, perhaps even be reinforced by the shock of apostasy, but agnostics are not in any danger of becoming outcasts.

But can the schools manage the issues? At the outset I suggested the need for modest expectations, for "attainability." Assuming that it is increasingly respectable to discuss the problematic aspects of growth in precollege classrooms, is it intellectually practical to do so? The answer, I'm afraid, is a rather subdued affirmative. Affirmative because the important forms of growth in the world today, and the mechanisms which feed them, are not too difficult to understand. Subdued because the issues *are* intricate.

Exponential increase is the crucial aspect of growth that must be grasped. Positive feedback (when dominant over negative feedback) is the mechanism that energizes it. Feedback simply refers to a situation in which the "effect" of some event loops back and influences the next event. Imagine a city whose streets are clogged with automobile commuters. An expressway is constructed to handle the traffic. The availability of the new expressway encourages more automobile commuting, which has the effect of clogging the expressway. So more expressways must be built, which in turn will soon be clogged.



In effect, the more traffic the more highways and the more highways the more traffic. In population, the more people the more births and the more births the more people. That's positive feedback. If automobile commuters were rational, the long delays on the crowded expressways, the increased rate of accidents, and the hours of breathing exhaust fumes might prompt the search for alternative transportation. Clogged streets might lead to mass transit and less auto traffic. That's negative feedback. Sometimes positive and negative feedback are in rough balance. When they are not, when positive feedback is stronger than negative feedback, high rates of exponential growth can result. In the case of world population, birth rates have remained high in many regions while death rates (negative feedback) have declined, producing a net growth of 2% each year. That's 2% of a growing population so each year the world adds more people than it added the year before. Thus exponential growth: a constant rate of growth applied to a growing amount.

Year	Population	Number Added (at 2% growth)
1975	4000 million	
1976	4080 "	80 million
1977	4161.6 "	81.6 "
1978	4244.8 "	83.2 "
1979	4329.7 "	84.9 "
1980	4416.3 "	86.6 "

If the world added 80 million people each year that would be linear growth; if you graph it you end up with a straight line. But the world is not adding the same number of people

each year; it is adding the same *percentage* (in this case 2%) of a growing total. Graph *that* and you end up with a steepening curve, the signature of dramatic and possibly catastrophic growth.

The dynamics of feedback and the characteristics of exponential growth are not beyond the reach of young students. Once grasped, they set the stage for at least a beginning comprehension of issues related to growth. The basic issue, and the most profoundly heretical, resides in the simple question "Is growth desirable?" That question can be applied to hundreds of specific instances, from plans to increase the agricultural productivity of South Asia to the housing policies of local communities in the U.S. It is not, of course, a simple question at all. Not too long ago it was. The answer was always "Of course!" Should community X permit real estate developers to build thousands of new houses on the edges of the city each year? Of course! Why? Well, partly because some people still live in substandard housing, but mostly because a lot of people who live reasonably well want to live even better. But what if the additional housing overloads the water and waste-disposal systems? That could be a problem, but we have to think about the local economy, too. If we don't keep building, a lot of carpenters, roofers, electricians, and other craftsmen won't have work and that means they won't be able to buy the things and services that keep the rest of us at work, and you know where that leads. So even if continued growth brings problems we don't dare stop, do we? Now you're getting it!

Questioning the desirability of growth forces all kinds of subterranean assumptions to the surface. That can be unsettling – like picking one's way through a philosophical minefield. Those bumps on the ground are value choices you never thought about before. Touch one and it may remove your equanimity for some time to come.

Is it realistic to imagine that precollege students can safely and usefully trod such difficult terrain? Usefully, yes, in a minor sort of way. Simulations can give students practice in the emergent arts and techniques of growth assessment.* Such simulations, of course, offer the merest shadow of actual experience, but they anticipate and legitimate a world where growth is increasingly subject to critical evaluation and less and less the outcome of cultural momentum. Safely? If that means without stress, no. We are in the process of transiting from one psychic order to another psychic order. We are beginning to see things that we never saw before, to know things that we never knew before, to doubt things that we never doubted before. It isn't comfortable. We are changing and it hurts.

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* See: "Simulating National Policy Choices," *Intercom* No. 77 (Winter 1974/75), Center for War/Peace Studies, pp. 42-48.

Awareness of Human Choices

some awareness of the problems of choice confronting individuals, nations, and the human species as consciousness and knowledge of the global system expands

Imagine a land of permanent dusk, a rough terrain through which winds a darkly gleaming river. Here and there across the landscape and along the river campfires glow. Around each fire a cluster of people, huddled against the dark, preoccupied with its own affairs. From time to time, there are forays into the area away from the light of the campfires and sometimes a brief contact with other groups. Not always a very rewarding contact. Each group has developed distinctive ways of living, ways that seem appropriate and natural to its members, bizarre and threatening to outsiders. But the dark separates and allows each group to cultivate its own mysteries and what it sees as its own territory, the area illuminated by the flickering light of its own campfire. And in the dark the downstream group does not know that the upstream group abides by the same river. Or even that it *is* a river and not a sea.

But now imagine (bear with me!) that the long night begins to end. The campfires which had once been the center of each group's existence now seem pale and the whole landscape is etched by brightness and shadow. The people stand amazed and trembling, their previous perceptions and understandings and myths washed away by the glare. The hills, each of which in the dark had been experienced singly, are now seen to be connected, forming a chain. Each group along the river sees for the first time that other groups share the same flowing waters. There are patterns to be seen – valleys and forests and a network of trails, a yellow and dusty embroidery of meadows vividly green. Outcroppings of rock that in the dark had seemed mysterious and ominous are shorn of their personalities and reduced to the ordinary. And other peoples that in the dark had seemed mysterious and sometimes ominous now look only awkward and a bit unsure.

This is fantasy – but it is also a fair depiction of the situation in which human species now finds itself. Flooded by new knowledge of how social and physical systems work and interact on the global stage, sensing trends and patterns never sensed before, newly able to see into the distance of time and imagine the future consequences of present actions. In the glare of new understandings, the old centers of our existence grow pale and old habits lose their authority. So we stand awkward and unsure, troubled by the need to resolve strange new questions, lacking confidence that the ethical principles of the past apply.

Pre-global to Global: A Transition

Throughout this paper I have talked of changes in awareness. Awareness of our own cultural perspective, awareness of how other peoples view the world, awareness of global dynamics and patterns of change. In this final section I wish to emphasize that such heightened awareness, desirable as it is, brings with it problems of choice. As an instance, in a "pre-awareness" stage the undoubted benefits of pesticides in agriculture, forestry, and the control of diseases such as malaria provide clear justification for prolific application.

But then information about the dangers of pesticides begins to accumulate. DDT is found in the tissues of organisms far removed from the points of application. Some species are threatened with extinction. Risks not only to present human populations but to future generations are identified. In some countries the use of certain pesticides is halted altogether. A change of awareness has occurred and new behaviors have resulted. In some parts of the world.

Where is the problem of choice? It lies in the fact that pesticides like DDT are still in use. Widely. Hundreds of millions of people depend on DDT to control malaria and agricultural pests. Ask someone in the developed countries if DDT is still in use and he will likely say no, answering in terms of his own country's practices. But pose the question on a world basis and the answer is yes. Viewed as a collectivity, the human species continues to use DDT.

This continued use constitutes a de facto human choice. In a conflict between the rights of living populations to control obvious and immediate threats to health and the rights of other living and future populations to freedom from subtle and long-term threats to health and subsistence, the former wins out. The immediate and the obvious triumph over the long-term and subtle. But although the choice seems to have been made the *problem* of choice remains. There is a new cognition in the world. We now know that there *are*

long-term and subtle risks. Once we did not. We now admit that other peoples and future generations *have* rights. Once we did not. That new knowledge has not had the power to halt the use of DDT where life and health are under severe threat, but it has had the effect of blocking its use in many other parts of the world. To put it simply, there are now two possible behaviors with respect to DDT:

– if it will solve a problem, use it

– *even* if it will solve a problem, don't use it

The second of these behaviors originates in the new cognition, the new awareness of risks and rights.

The DDT situation is simply an instance, a small manifestation of the major cognitive revolution that is now underway. But it is a representative one. Many practices once essentially automatic, whose benefits were assumed, are now questioned. They are questioned because we know new things. We know how to measure minute quantities. We know that factors interconnect in complex ways. We know that there are limits to the resources and carrying capacity of the planet. In the context of the new cognition, action does not proceed automatically. Calculations of advantage and disadvantage become explicit and detailed. Choosing a course of behavior becomes a more reasoned process. That shift – from the automatic to the calculated – is a very important expression of the cognitive revolution we are now experiencing.

Let me expand on the **concept of cognitive revolution**, particularly as represented in the writings of the economist Robert Solo. Solo developed the concept of "cognitive revolution" in his book *Economic Organizations and Social Systems*. In that book he analyzed and compared stages of economic development in terms of what people could question and think about.

> Those values, conceptions, relationships, and forms of functional organization which, for a society, are set beyond the pale of critical evaluation or reasoned change are called here *traditional*. Those that are considered open to critical evaluation and are systematically challenged and changed will be termed *rational*.... For every society there is a zone of the rational and a zone of the traditional. What is contained in the zone of the rational vis a vis the zone of the traditional is of fundamental importance in determining the capacity of a society for economic development.
>
> . . . most Americans consider any machine or mechanism, any technique or process of production, or any business organization to be properly subject to critical evaluation, to reasoned study, to purposeful change. In the light of this rational cognition of mechanism, of technical process, and of business organization, Americans have developed the ways and means of subjecting these to systematic analysis, evaluation and change. For some other societies, and particularly the "developing" ones, the cognition of mechanism, or process, and of business organization fall within the zone of the traditional. They are . . . outside the scope of systematic challenge or change.*

Solo goes on to examine three stages of historical economic development in these terms. In the **craft economy**, individual activities, various technical processes, and the relationships among economic actors all fall within the traditional. The craft economy ". . . manages itself, following its beaten paths, moving by an ancient clockwork that has been driven into the instincts of the individual and into the habits of the group."*

The **shop economy** was ushered in by the Industrial Revolution.

> The Industrial Revolution was part of a general assault on the traditional society by the individual in the rational pursuit of his self-interest . . . each was on his own, out for himself, free within the scope of his personal powers to inquire, to manipulate, to change the world for the sake of personal advantage . . . Each operation, and consequently the whole economy, was driven by the open-ended desire of the single individual for more for himself, more to consume, more to possess, more to display, more as a mark of worth and success. The "craft economy" of artisan and peasant became the "shop economy" of the technician-inventor and the free-wheeling entrepreneur . . . The watchwords in the shop economy were not authority but efficiency, not continuity but progress, not status but success . . . The ancient rhythms of the crafts were stop-watched, manipulated, speeded, divided into parts, analyzed, redesigned. . . .†

Rationality, however, stopped at the shop door.

> All that went on within his factory or shop was submitted to the critical inquiry and creative imagination of the owner-entrepreneur. But what of the interaction of his ship with all the myriad of others? . . . These interactions were not brought within the zone of the rational. What occurred in the market vortex was not subjected to critical analysis or reasoned, deliberated change.**

Then came the **Organizational Revolution.**

> Another fundamental change in the scope of the rational cognition is now occurring. In the name of economic planning, or of political direction, or through the development of autonomous corporations that encompass a vast number of complex activities, the rational cognition is being extended beyond the scope of individual supervision and of private self-interest. Virtually all economic relationships are being opened to inquiry, to analysis, and to the possibility of control and systematic change . . . this extension of the rational cognition is coming about in many ways and has been expressed in a variety of functional organizations. In Russia and China it is being engineered from the top downward with the rationality introduced first in the control of general relationships and in reference to collective goals. In the United States and Western Europe, emerging out of the rationality of small entities, it is occurring in the corollary growth of the large corporation and the extension of political responsibility.††

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* Robert A. Solo, *Economic Organizations and Social Systems* (Bobbs-Merrill Co., Inc., 1967), p. 376.

* Ibid., pp. 377, 378.

† Ibid., pp. 379, 380.

** Ibid., p. 381.

†† Ibid., pp. 381, 382.

With apologies to Solo for the simplification the differences between craft, shop, and organizational economies might be charted as follows:

	Traditional	Rational
Craft	individual behavior social interactions	
Shop	social interactions	individual behavior
Organizational		individual behavior social interactions

In the craft economy both individual economic activities and the relations among individuals are customary, habitual, unquestioned. The Industrial Revolution and its shop economy open individual economic activities to critical evaluation in order to maximize individual gain, but economic interactions (the market) remain unquestioned and unplanned. The organizational economy is marked by the application of reason to both individual economic activities and interactions.

Global Awareness and Systems Interaction

The clear trend in this sequence of economic modes is from tradition to reason, from the habitual to the questioned and calculated. *That same trend, I believe, can be discerned in the cognitive revolution that underlies the emergence of a global perspective.* The new cognition, the global cognition, is characterized by new knowledge and a more deliberate use of it. The differences between the pre-global cognition and the global cognition can be displayed in a chart similar to the one above.

	Traditional (either unseen or unquestioned)	Rational (subject to critical evaluation)
Pre-global Cognition	long-term consequences linkages between events social goals and values effects on other societies primacy of national interests	short-term consequences (for one's own group – family, company, country) methods and techniques for maximizing benefits for one's own group
Global Cognition		long-term consequences linkages between events social goals and values effects on other societies the relationship of national interests to human interests methods and techniques for maximizing human welfare

This chart, too, is an outrageous simplification but in shorthand it says something like the following. In the pre-global stage, rational consideration of goals, methods, and consequences tends to be limited to the near – the near in time and the near in social identity. The preoccupation with the short-term and the neglect of the long-term has been particularly characteristic of Western industrial societies. Engineering prowess, economic production, and developments in scientific knowledge gave them a strong sense of competence in coping with any problems that might arise. With the evidence of their success (self-defined) accumulating around them, attention to *future* problems seemed a meaningless exercise. American culture has taken the tendency a step further, displaying an almost phobic reaction to long-term thinking and planning. Planners were un-American, dangerous radicals trying to upset the natural balance achieved by the unplanned interplay of private interests. In very recent years a new tolerance for longer-range planning has emerged as an adaptive response to energy deficits, but the old habits of mind remain strong, reinforced by such mechanisms as year-to-year governmental budgets. The most systematic approach to planning is probably to be found in the Defense Department. Even here, though, the planning is for contingencies. The future is conceived as an array of possible situations, with some attempt to assign probabilities. Plans are drawn so that when a situation arises the response can be quick and appropriate. Such plans can be extraordinarily sophisticated, but analysis of the long-term consequences of each possible alternative response, and the costs to populations other than one's own, tend to fall outside the boundaries of the calculations, or at least outside the realm of things deemed important. Even costs to one's own population are portrayed in a technical jargon that discounts their importance and meaning. Remember *megadeaths?*

Pre-global cognition is characterized not only by a constricted view of the future but by a relatively simple theory of linkages between events, a linear theory in which some things are causes and other things are effects. This theory leads in its most exaggerated and magical form to the conclusion that conditions are the result of single causes, sometimes personified. In primitive societies this is the basis of witchcraft and ghost beliefs. In a sophisticated society like our own we have the recent example of two presidents who employed the C.I.A. to locate the sinister foreign influence that must surely have been the root cause of the antiwar movement.

In the pre-global stage social goals and values are not, as the chart seems to say, entirely unquestioned. But the tendency is in that direction. In 19th century America, developing the wilderness was an essentially unquestioned social goal and human dominance over nature an essentially unquestioned value. In the 1970s developing domestic energy resources is a largely unquestioned social goal and economic growth a largely unquestioned value.

The pursuit of goals (as noted earlier) almost inevitably has consequences that range far beyond those intended. When energetic collectivities like nations pursue goals, the consequences for other nations can be massive. It is typical of the pre-global state that such effects on other societies have little standing. Maximization of national self-interest is paramount and since the connections between "external" and "internal" conditions are dimly perceived and poorly

understood, practices and policies that have destructive effects beyond the national borders can be followed without recognition of the self-destructive implications. Further, since the protection of national interests is an expansive enough concept to include suicidal displays of pride and determination, the scale of destruction visited on others can be awesome. For the last 25 years it has been possible for Russia and the U.S. to contemplate seriously the use of weapons that would devastate not just the two countries but the planet, for generations to come. That kind of nonchalance about effects on others epitomizes the pre-global cognition.

Global Awareness and Human Problems

The emergent global cognition contrasts sharply with the pre-global. Long-term consequences begin to be considered. Linkages between events are seen in the more complex light of systems theory. Social goals and values are made explicit and vulnerable to challenge. And nations begin to note that their interests and activities are not separable from the interests and activities of others. Further, systematic attention is given to problems that transcend the national, regional, or coalitional. *Human* problems.

A global cognition has certainly not been achieved. Pre-global forms of knowing continue to orient much of human behavior. But the transition is underway, driven by the convergent energies of a variety of social movements. If the essence of the transition is the shift from the unquestioned to the consciously considered, then science must be seen as the most potent of these movements. Demanding exposure of assumptions, active and systematic collection of evidence, and a fluid readiness to alter conclusions in the light of new data, the ethic and procedures of science pose a profound challenge to other modes of knowing. The challenge is worldwide. Scientific inquiries have been so manifestly productive that scientific methods are universally employed, permeating almost every aspect of human activity.

Within the main current of the scientific movement, or closely associated with it, are developments in technology that constitute a movement in their own right. There are the measuring and observation instruments that make it possible to detect, monitor, count, and analyze tiny quantities of chemicals, patterns of macro-change on the earth's surface, electromagnetic radiation, microscopic structures. These are more than devices for generating the data that leads to pure knowledge. They are tools for monitoring the consequences of human action. Whether a satellite sensor detecting an oil spill or a gas chromatograph measuring the parts per million of DDT in animal tissue, such instruments extend the human nervous system *and* thus the probability of human action based on rational calculations of effect.

Other technologies and institutions are contributing to the emergence of a global cognition. The computer plays an important role in world demographic and economic studies and in the systems engineering movement. The latter, which had its early applications in military and corporate planning, uses the computer to work rapidly through the thousands of equations that posit how and with what quantitative force various factors in the world system relate to one another. Systems engineering and its models of how the world works can be challenged on many grounds, not the least of which is that its forecasts may be just plain wrong. But accuracy at this point is less important than intention and effort. Studies like *The Limits to Growth* represent an altogether new level of concern with long-term effects, complex linkages of factors, and the worldwide consequences of local decisions and actions. Computer technology clearly facilitates this particular approach and the consequent healthy shocks to conventional wisdom inherent in its "counterintuitive" results.

I don't wish to exaggerate the influence of science and technology on the development of a global cognition. Other forces are at work, even a few aimed directly at the target. But the unaimed, the inadvertent, are perhaps the more important. This would certainly include anything tending to enrich the vision of nation-states as they pursue their "interests." Even the much maligned multinationals might contribute to such an enriched vision. Corporate managers with far-flung interests may take a longer, more complex view in some instances than political leaders. Their perspectives are not channeled by popular attitudes; their interests are not served by the success of any one nation. The multinationals as organizations are creators and beneficiaries and necessarily guardians of what is fashionably called interdependence.

The popularity of that term – interdependence – testifies in itself to the reality of the movement toward a global cognition. I have been troubled at times by the facile use of the term, believing that it was a technical concept and meant to be used with technical precision. If interdependence meant mutual dependence did that extend to asymmetrical relationships? For example, what about trade between the economically weak and the economically strong, where in one sense each needed the other but possessed decidedly unequal bargaining powers? Or what about the mutual dependence of antagonists, e.g., military establishments? External threats are the primary nutriants of military organizations; with a high enough level of threat they grow and careers flourish. They depend for those threats not on their friends but on their enemies. Surely that is a kind of interdependence.

All of the complaining was nonsense on my part. It took a while but it finally hit me. Interdependence was not a technical term at all. It was a code word. Social movements need their code words and of course they use them a bit crudely. But the core message was there. The word was a distilled argument, a challenge to the conceit of autonomous power and privilege, a call for recognition of connections and consequences and vulnerabilities that the old cognition did not admit. And, like other code words, it was a badge of identity. To speak of interdependence was to belong to those who knew how the world *really* works.

Let us consider. Proposition one: we are in a period of transition, moving from a pre-global to a global cognition. Proposition two: global cognition is characterized by new knowledge of system interactions, by new knowledge of long-range and wide-range effects, and by a more conscious use of such knowledge in planning human action. Proposition three: as such knowledge and its rational use expands, human choices expand. Proposition four: an awareness of this expanded range of choice constitutes an important dimension of a global perspective.

Awareness and Alternative Choices

Concretely, what might such awareness involve? It might involve knowing of proposed alternatives to continued economic growth, as in the so-called steady state world or equilibrium society. It might involve knowing of alternatives to *national* policies of humanitarian aid and technical assistance, as in proposals for *concerted* efforts by the developed nations to build not only the agricultural and industrial capacities of developing regions but a more coordinated global economy in which emergency needs for food aid would be much reduced and in which necessary food imports could be paid for by regionally specialized industrial exports. Or, in some contrast to the high technology on which the latter proposals depend, it might entail knowing of the small-scale, self-sufficient food and energy systems being devised by John Todd and the New Alchemists group at Woods Hole* or some exposure to E.F. Schumacher's ideas about "intermediate technology."† It might consist merely in recognizing that the energy deficit used to justify development of such dangerous technologies as the fast breeder reactor is the product of a particularly gluttonous way of life, and that changing our habits may be a reasonable alternative to risking our habitat.

World Hunger: A Case Study of Alternative Choices

As a way of exploring in more detail what an increased awareness of choices might mean, consider the problem of hunger and malnutrition in some areas of the developing world. Prevailing practices call for donations of food to meet emergency situations and technical assistance to increase local productivity, both allocated largely at the discretion of individual governments. Motives tend to be mixed, political aims clearly interwoven with humanitarianism. The West sees fragile economies as susceptible to infection from the left and seeks to strengthen their resistance. The collectivist countries use aid to build political debt and opportunity, looking toward eventual restructuring of the total society. The competitors, however, share this: they meet their own cultural/ideological expectations and serve their own political interests through the actions they undertake. The primacy of those expectations and interests is never in doubt.

The prevailing practices, at least at current levels, are not doing the job. The secretary-general of the UN's Food and Agriculture Organization noted in a recent speech that the goal of self-sufficiency in food within a decade could not be met and that "the most urgent need . . . in the immediate years ahead will be for a radical increase in food aid on a guaranteed basis."** The 1974 World Food Conference suggested that the developing countries work toward an annual increase of agricultural production of 3.6 percent, a rate of increase that, unlike the current 1.6 percent, would outrun population growth. In his appraisal the FAO official said, "To speak frankly, it is clear that such a transformation cannot be brought about within the next ten years."

* Nicholas Wade, "New Alchemy Institute: Search for an Alternative Agriculture," *Science*, February 28, 1975, pp. 727-729.

† E. F. Schumacher, *Small is Beautiful* (Harper & Row, 1973).

** *New York Times*, June 26, 1975.

Conventional Answer

The conventional assessment of the situation, then, goes something like this. Hundreds of millions of people lack adequate food. They should be helped. Help consists of direct food transfer, technical assistance, and investment. Such help has averted immediate calamities, there have been breakthroughs in agricultural productivity, but there are no guarantees of long-term assistance, and investment commitments are insufficient. Furthermore, the recipients seem unable to achieve some of the changes in their societies, e.g. land reform and income redistribution, which might facilitate economic development and gradually eliminate the need for outside assistance. So the problem of hunger in the world remains unsolved.

One conventional answer (at least in the West) to the stubbornness of the problem is to increase the level of assistance. This is essentially what the FAO official was proposing. *More* direct food aid, *more* technical assistance, *more* investment in agricultural production by both the developing and the developed countries. (Population control has been a standard component of the conventional answer but this has become an increasingly delicate subject, with much suspicion of Western motives.)

Increases in assistance are not everywhere accepted as the answer, but some level of aid is assumed. A June 1975 item in the *New York Times* noted that "the European Common Market governments refused early today to increase their contributions of grain to needy countries."* Debate centers not on whether there should be aid but on how much, of what type, where allocated, for what reasons, and with what probable results. These are questions discussed by national and regional policymakers, and the answers reflect national and regional priorities and concerns.

The discussion, of course, is highly technical and the sketch I have given does not do justice to the variety of ideas or the sophistication of analyses that play a part in decisions. There have been decades of concentrated attention to problems of economic development, thousands of studies and projects and programs. On the basis of this work by the specialists, however, broad policies are developed and the public acquires a rough sense of what the alternatives are. *It is my impression that until quite recently the public conception of alternative policies for dealing with world hunger reduced the question to "How much aid should my country contribute?"* There are two assumptions in that question. The first is that aid should be given. The second is that decisions about aid are properly national (or regional as in the case of the Common Market.)

Challenges to Traditional Approaches

Consider, now, some ideas that challenge or bend these assumptions and the traditional approaches to aid. The biggest public splash has been made by the proposal to apply the criteria of *triage* to decisions about aid, and by Garrett Hardin's "lifeboat ethics." *Triage* is a battlefield surgery concept that focuses assistance on those who need help and can be helped. Those who cannot be saved and those who will survive without aid receive no attention. Hardin's lifeboat

* *New York Times*, June 26, 1975.

analogue simply proposes that pulling the drowning into a lifeboat already filled and ready to swamp dooms all; the survival of some requires letting others go under.

These are public shockers and have been widely denounced as morally reprehensible. *Triage* says don't assume that every desperate situation can be salvaged; allocate your resources on the basis of deliberate judgments about who can really be helped. Deny the self-gratifications of charity mindlessly diffused and substitute the more sober rewards that come from concrete improvements in selected situations. Hardin's message is somewhat different. He raises the possibility that the giving of aid can be dangerous; don't risk the whole human species in order to save part of it. *Triage* says be effective. Hardin says be careful. Both deny the easy satisfactions of the humanitarian impulse and both ignore political criteria.

A message in a similar vein comes from Jay Forrester of MIT. Forrester's work is in computer models of systems and in recent years he has turned his attention from engineering systems to social systems. His studies have led to the following view of humanitarian efforts:

> Humanitarian concern means help for one's less fortunate fellowman. At times such help is based on a much too simplistic view of the situation. It is usually aimed at immediate goals. Long-term and short-term goals may be in conflict. When does help in the present lead to increased distress in the future?
>
> Consider an overpopulated country. Its standard of living is low, food is insufficient, health is poor, and misery abounds. Such a country is especially vulnerable to any natural adversity. . . . Droughts bring starvation; but is that due to weather or to the overpopulation that made sufficient food stocks impossible? The country is operating in the overextended mode where all adversities are resolved by a rise in the death rate. . . . But suppose that humanitarian impulses lead to massive relief efforts from the outside for each natural disaster. What is the long-term result? The people who are saved raise the population still higher. With more population the vulnerability of the country is increased. . . . Disasters occur oftener and relief is required more frequently. But relief leads to a net increase in the population, to more people in crisis, to a still greater need for relief, and eventually to a situation that even relief cannot handle.*

In many ways this is not a new argument but in Forrester's case it derives from and is bolstered by a relatively new procedure of forecasting – the computer modeling of systems. In a rather famous paper, "The Counterintuitive Behavior of Social Systems", Forrester details the advantages of this approach:

> It is my basic theme that the human mind is not adapted to interpreting how social systems behave. Our social systems belong to the class called multiple-loop nonlinear feedback systems. In the long history of human evolution it has not been necessary for man to understand these systems until very recent historical times. Evolutionary processes have not given us the mental skill needed to interpret properly the dynamic behavior of the systems of which we have now become a part. . . .
>
> Until recently, there has been no way to estimate the behavior of social systems except by contemplation, discussion, argument, and guesswork. . . . It is now possible to construct realistic models of social systems in the laboratory. Such models are simplifications of the actual social system but can be far more comprehensive than the mental models that we otherwise use as the basis for debating governmental action. . . .
>
> The mental model is fuzzy. It is incomplete. Furthermore, within one individual a mental model changes with time and even during the flow of a single conversation. . . . Fundamental assumptions differ but are never brought into the open. Goals are different and are left unstated. . . . it is not surprising that consensus leads to laws and programs that fail in their objectives or produce new difficulties greater than those that have been relieved.
>
> For these reasons we stress the importance of being explicit about assumptions and interrelating them in a computer model. . . . But the most important difference between the properly conceived computer model and the mental model is in the ability to determine the dynamic consequences when the assumptions within the model interact with one another. The human mind is not adapted to sensing correctly the consequences of a mental model. . . . The inability of the human mind to use its own mental models is clearly shown when a computer model is constructed to reproduce the assumptions held by a single person. . . . Then it usually happens that the system that has been described does not act the way the person anticipated.*

Forrester would argue, then, that solutions to the world food problem should be determined by fashioning a very explicit model of how the world system works (what affects what), adding pertinent data, and then letting the computer test the consequences of alternative policies. This, in fact, has been done. Mesarovic and Pestel, in their study *Mankind at the Turning Point*, tested hundreds of scenarios for South Asia, a region particularly susceptible to food shortages. Their *standard* scenario assumed that "the historical pattern of development based on a somewhat optimistic view of the past and present situation will continue."

> We. . . assume that an equilibrium fertility level will be attained in about fifty years. We also assume, quite optimistically, that the average use of fertilizer per hectare in the entire region will surpass the present North American level toward the end of the fifty-year period. At that time South Asia alone will consume more fertilizer than the whole world consumed in 1960. Assuming that the fertilizer is used on every piece of land under cultivation, the yield per hectare will increase by about 1000 kilograms – approximately the increase that the Green Revolution brought to the best lands in India and Pakistan. Still proceeding optimistically, we assume that all remaining arable land in South Asia is quickly brought under cultivation, and that all technological inputs, such as irrigation systems (which must accompany the fertilizer to produce high-yielding

* Jay W. Forrester, "Churches at the Transition Between Growth and World Equilibrium," in Dennis L. Meadows and Donella H. Meadows, eds., *Toward Global Equilibrium: Collected Papers* (Wright-Allen Press, Inc., 1973), pp. 351, 352.

* Jay W. Forrester, "Counterintuitive Behavior of Social Systems," *Technology Review*, January 1971.

grain), will be available as needed. Finally, we have assumed that no mass starvation takes place. The difference between the food needs of the region and the food production in the region. . . is assumed to have been made available by other regions.

Our computer analysis, pregnant with optimism, shows clearly that the food crisis in South Asia will worsen. In spite of all the advancements assumed, the availability of fertilizer and land assumed, the protein deficit will continuously increase; by the year 2025 it will be up to 50 million tons annually. Such deficits could never be closed by imports: to pay for that quantity of imports, South Asia would have to spend one third of its total economic output, and three times what it earns from exports. But even if South Asia had that kind of money, the physical problems of handling those quantities of food would be incredible. In one year the region would then have to import 500 million tons of grain – *twice as much as the total tonnage of all goods now being shipped overseas from the United States.* . . . Moreover, these quantities would have to be delivered every year, in ever increasing amounts, without end. In sum, it would be impossible.*

What Mesarovic and Pestel really expect for South Asia is tragedy. Since the demands of the *standard* scenario cannot be met, the problems will be resolved by natural means – a much increased death rate. The only way to avert the tragedy, they say, lies in policies tested in another scenario. These policies include a population control plan that looks to fertility equilibrium in 15 years, a concerted effort by the developed world to build the agricultural and industrial capacities of the region, and the creation of a coordinated world economic order.

> In the fifth scenario, investment aid is provided to South Asia in sufficient amount and at the time needed to close the food-supply gap and the export-import imbalance. The magnitude of such a program will require a concerted effort by the entire Developed World. The export potential of South Asia would be increased substantially, and the world economic system would have to be modified so that South Asia could pay from exports for most of its food imports. These exports would have to be industrial, since the regional food demands obviously will absorb the local agricultural output. But to make this scenario feasible, the Developed World must help South Asia to develop its own exportable and competitive industrial specialization.
>
> Scenario five – the only way to avert unprecedented disaster in South Asia – requires the emergence of a new global economic order. Industrial diversification will have to be worldwide and carefully planned with special regard for regional specificity. The most effective use of labor and capital, and the availability of resources, will have to be assessed on a global, long-term basis. Such a system cannot be left to the mercy of narrow national interests, but must rely on long-range world economic arrangements.†

Note the prime condition for saving South Asia. Not the erratic provision of aid at the discretion of individual nations but a massive, concerted program in the context of a coordinated world economy.

* Mesarovic and Pestel, op. cit., pp. 121, 122.

† Ibid., pp. 125, 127.

These four view points – *triage*, lifeboat ethics, Forrester's ideas about humanitarianism, the Mesarovic-Pestel conclusions – represent alternatives to conventional responses to the hunger problem. And, in some measure, all display the distinguishing marks of global cognition. All suggest that customary responses to the needy be set aside and replaced by more deliberate, more effective measures, even though these outrage conventional wisdom or morality or national sensitivities and sovereignties. Simple theories of cause and effect (the problem is a food deficit: the solution is more food) are set aside in favor of more complex theories. Assumptions, criteria, and goals are made much more explicit. And the goals themselves change, from simple rescue of those in immediate distress to consideration of the survival of the species. Further, the nation as the main actor in policymaking is challenged in favor of coordinated global planning.

To know of these alternative viewpoints is to expand one's repertoire of choice. To know of them, also, is to become aware of problems of choice, dilemmas that do not present themselves when the vision is more limited. In spite of the difficulties raised, however, this increased consciousness is surely an important constituent of a global perspective.

Access to such alternative viewpoints is not especially difficult these days but it is by no means automatic. Efforts must be made and some of those efforts can take place in the schools. An operationally defined mission for educators might be to increase the *number* of solutions that students can propose for a given problem and the *quality* of the solutions, as measured by criteria of global cognition. That would include being sensitive to the likely consequences of different policies and particularly to the differences between short-term and long-term consequences. After instruction, a student would be able to advance more solutions, including some that rest on nonlinear theories of social dynamics and that incorporate a concern for peoples and generations other than those that *seem* to be involved.

Such an increase in awareness is, I think, a fairly modest goal. I am not proposing that students choose among alternatives – only that they know of them. This in itself is a mildly revolutionary step. It means becoming more conscious, potentially less bound to custom and convention. Is such awareness enough? Enough for what? We are talking here of a *global perspective*, from which other things may flow. Let's say, simply, that such an increase in awareness is a solid and necessary base from which to proceed.

* * *

I have discussed five dimensions of a global perspective. Are there more? I am tempted to be waggish and say no, this is it, the final crystalline truth. But of course there are more, as many more as anyone cares to invent. And that, of course, is precisely the case. Such dimensions are inventions, constructs of the mind. This particular set is just one assemblage, a collage of ideas selected and shaped by one individual's proclivities and prejudices. This is not to say that there are not real changes underway in human consciousness. I am convinced that there are and that they are in the direction of something that can be called a global perspective. But any particular description of that phenomenon is properly suspect. Even this one which is, by coincidence, my favorite.